AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING - - SHEET METAL CONTRACTING

MARCH 1944

Why You Are Not Getting Your Materials - - - - - - - - - - - - Page 46
Where, When, Why—Barometric Dampers - - - - - - - - - - - Page 58
Hydro-Press, Punch Press, Drop Hammer Forming - - - - - - - - Page 72

THE IDEAL REGISTER FOR WAR TIME HOUSING

Air Control adjustable ceiling ventilators

No. 300 Adjustable Ventilators consist of one black floor register, one white face and a connecting telescoping metal box—adjustable for any floor to ceiling thickness. They are easy to install.

Thousands of war workers' homes have been built in the last few years — most of these homes are heated with space heaters, floor furnaces, stoves, etc. These homes require air circulation to upper rooms. AIR CONTROL adjustable ceiling ventilators are the answer to this demand — are you selling this market?

AIR CONTROL offers a register for your every need. Call your Air Control jobber at once!

also ARMS for AMERICA'S FIGHTING FORCES

Air Control Products, Inc.

COOPERSVILLE • MICHIGAN

Thor PORTABLE ELECTRIC TOOLS

SAVE TIME AND MAN HOURS!

In the Shop . . . and on the Job

Thor
¼" PLASTIC DRILLS
light, small and powerful, they deliver more work faster!

Thor
ELECTRIC HAMMERS
faster and more powerful, for work in stone, wood, metal.

● From the moment you start fabricating a unit *in your shop* until you install it on the job, there's a Thor Portable Electric Tool for nearly every operation that will help you do that job faster!

Powered for production, but designed for lighter weight and handling ease *just right* for the lighter jobs and installations like yours, there are Thor Portable Electric drills, screwdrivers, nut setters, tappers, grinders, sanders, polishers, hammers, nibblers, saws and bench grinders that will *save you time and man hours* wherever you use them. Write today for full details.

Thor PORTABLE ELECTRIC TOOLS
Speed All Jobs
Drills • Grinders • Hammers • Saws • Nibblers
Screwdrivers • Nut Setters
Sanders • Polishers • Tappers • Bench Grinders

Thor *Portable Pneumatic and Electric Tools*
INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.
Branches in Principal Cities

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES & SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 113, No. 3 — March, 1944 — Founded 1880

CONTENTS

Suggestions for Your Manpower Problem..... 41
A Monthly Budget for Sales and Costs..... 42
Amendments, Interpretations to Existing Orders..... 44
Kruckman—Why You Don't Get Materials..... 46
N.W.A.H.&A.C. Ass'n History (Part 12)..... 48
On Our Industry's Front..... 50
Wisconsin Convention Looks at Post-War..... 82
Association Activities..... 84
New Products..... 86
New Literature..... 88
With the Manufacturers..... 98
AA's War Trade News.....120

THE RESIDENTIAL AIR CONDITIONING SECTION

Konzo—Checking Warm Air Pipe Sizes..... 53
Stoker Refinements Which Improve Service (Part 2)... 57
Where, When, Why Barometric Dampers..... 58
Sub-Floor Heating Experience..... 62
Neubecker—Tapering Transition Elbow..... 64

THE SHEET METAL SECTION

Refrigerant Cooled Spot Welding (Part 2)..... 69
Zideck-Hydro-Press, Punch Press, Drop Hammer..... 72
Three Fundamental Fan Laws..... 76
Womanpower Plus Modern Equipment in a War Plant 78

In This Issue

THIS month's front cover photo shows war worker houses erected in New Haven, Conn., by the Federal Public Housing Authority. Photo used by permission of FPHA. An article on some early experiments in heating the first publicly financed housing under TVA appears on page 62. The subject was sub-floor heating as a means of reducing floor-ceiling temperature differences.

• • •

The photograph used on the Sheet Metal Section cover shows a Black & Decker 9-inch Sander cleaning the outer surface of a fan housing.

• • •

An article in the January issue announced Barometric Dampers as available for sale this year under a material allocation from WPB. Barometric dampers have been used so long and as such a matter of course on oil and stoker-fired installations that the editors believed every reader knew all there is to be known about them.

But at a recent state convention so much discussion arose over why to use barometric dampers—where to install them—when they should be used—that it seemed evident many users do not know all about these useful adjuncts. So this second article is published to tell When, Where, Why. Several manufacturers contributed their knowledge to this article. (Page 58).

• • •

On page 69, Part 2 of a three-part article on the latest ideas in improving spot welding practice appears. This idea centers on the cooling of the electrodes by refrigeration in order to keep the material from sticking to the electrode and to make possible longer runs of spots before stopping to allow the electrodes to cool down. This article is one of the early reports—since the data was released the tests have continued. Later articles will bring the data up to date.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 N. Michigan Ave., Chicago (2), Ill., U. S. A.

Copyright 1944 by Keeney Publishing Company.

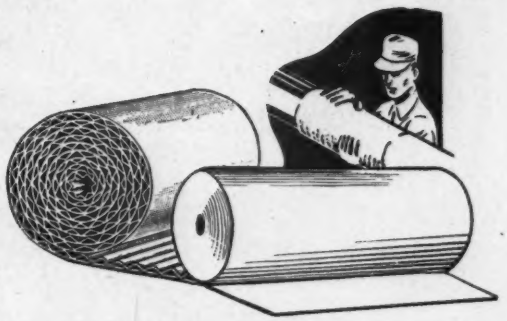
Publisher—Frank P. Keeney; Manager—Chas. E. Price. Advertising staff: Wallace J. Osborn, New York City, Telephone—Murray Hill 9-8293; J. D. Thomas, Chicago, Telephone—State 6916; Robert A. Jack, Cleveland, Telephone—Yellowstone 1540; J. H. Tinkham, Los Angeles, Telephone—Richmond 6191.

Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, $2.00; Foreign, $4.00. Single copies, U. S. and possessions, $.25. Back numbers, $.50. January, 1944, Directory issue, $1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

A Record for QUALITY in Fireproofing and Insulation

For 57 years the Sall Mountain Company has been serving the nation's Fireproofing and Insulating needs with quality asbestos products.

Sal-Mo Asbestos Products are made from the finest materials obtainable by experts who are thoroughly familiar with the exacting needs of users of asbestos.



SAL-MO ASBESTOS AND AIRCELL PAPERS

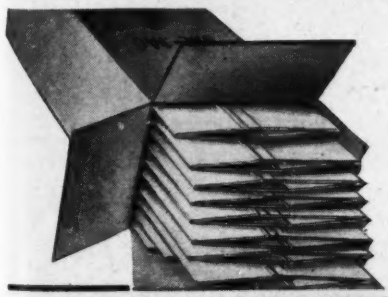
For insulation and protection. Made from best grades of selected asbestos fibre into a smooth, strong, white sheet.
AIRCELL—With corrugations ¼"; rolls 36½" wide, 250 square feet.
ASBESTOS PAPER—In standard rolls, 18", 24", 36" widths, weighing 6, 8, 10, 12, 14, 16 and 32 lbs. per 100 square feet. Also 3/32" and ⅛" thick.

SAL-MO NO. 77 DUCTBOARD

An ASBESTOS product, developed for constructing ducts in warm air heating, air conditioning and ventilating systems. A genuine saving in steel. Furnished in sheets 33" x 48". Easy to handle; easy to apply; fireproof.

SAL-MO ASBESTOS FURNACE CEMENT

Scientifically made from the best grades of asbestos fibre and high temperature refractories. Easy to apply, binds immediately, hardens and cures quickly and will not crack or shrink. Forms perfect bond with castings and linings. Conforms with the Furnace Manufacturers' specifications.



SAL-MO SUPPLY DUCT

Non-metallic duct material for constructing both supply and return lines. Its use saves as much as 90% of the critical materials that usually go into Warm Air Heating, Air Conditioning and Ventilating systems.

Sal-Mo Supply Duct is fabricated and packaged at the factory, saving space in shipping and handling; it is APPROVED AND LISTED by Underwriters' Laboratories, Inc.; it is light, strong and quickly erected. Conforms with Federal Specifications S S A-118. Available in 26 sizes and in flat sheets.

OTHER SAL-MO ASBESTOS PRODUCTS—Asbestos Paper and Millboard (Commercial and Gasket Grades) . . . All types of High and Low Pressure Pipe Coverings, such as Asbestos Aircell, Wool Felt, Sponge Felt and Frost-proof . . . Asbestos Aircell Sheets and Blocks, and special sheets cut to size . . . Furnace and Boiler Cements . . . Range Boiler Jackets.

Phone Andover 2414

SALL MOUNTAIN COMPANY

176 WEST ADAMS STREET • CHICAGO 3 • ILLINOIS

CHRYSLER AIRTEMP has created The Triple Line

Here's why: Every heating dealer is looking for new opportunities in the postwar period . . . wants to be sure of 12 months *profitable operation!* That is why Chrysler Airtemp created The Triple Line . . . heating, air conditioning and commercial refrigeration.

THE HEATING LINE

Chrysler Airtemp offers a complete line of heating equipment—burning all types of fuel—that will capture the public preference. New, advanced in design, backed by the famous Chrysler name and engineering, each unit establishes a new, high standard of efficiency and economy in operation and maintenance.

AIR CONDITIONING

Chrysler Airtemp year 'round air conditioning for modest homes which was sold before the war, will be even better in the postwar period. Chrysler Airtemp Packaged Air Conditioners are the leaders for commercial stores and buildings. The market for both of these products is tremendous.

COMMERCIAL REFRIGERATION

Chrysler Airtemp produces a complete line of refrigeration compressors from fractional up to 75 horsepower in heavy duty units. The protection of perishables is a year 'round *must.* The sale of commercial refrigeration units and service opens up a big volume market for Airtemp dealers.

12 MONTHS PROFITABLE OPERATION

The demands for heating, air conditioning and commercial refrigeration provide a steady flow of revenue each month of the year. No more peaks and valleys that always go with a single, seasonal product market. The Chrysler Airtemp Triple Line offers a brand new conception of money-making opportunities for heating dealers.

Chrysler Airtemp wants to make direct dealer arrangements for the Heating line alone or in combination with Air Conditioning—or Commercial Refrigeration—or for all three lines.

Next month's advertisement will be devoted to the subject of direct dealer contracts. Be sure to read it.

THE TRIPLE LINE

Chrysler Airtemp engineered and built equipment for control of all temperature requirements in homes, buildings, industry.

The Indoor Climate Institute is making the American public conscious of the need for greater indoor comfort and health.

MEMBER I.C.I. INDOOR CLIMATE INSTITUTE SYMBOL OF GREATER INDOOR COMFORT

BUY WAR BONDS

CHRYSLER AIRTEMP

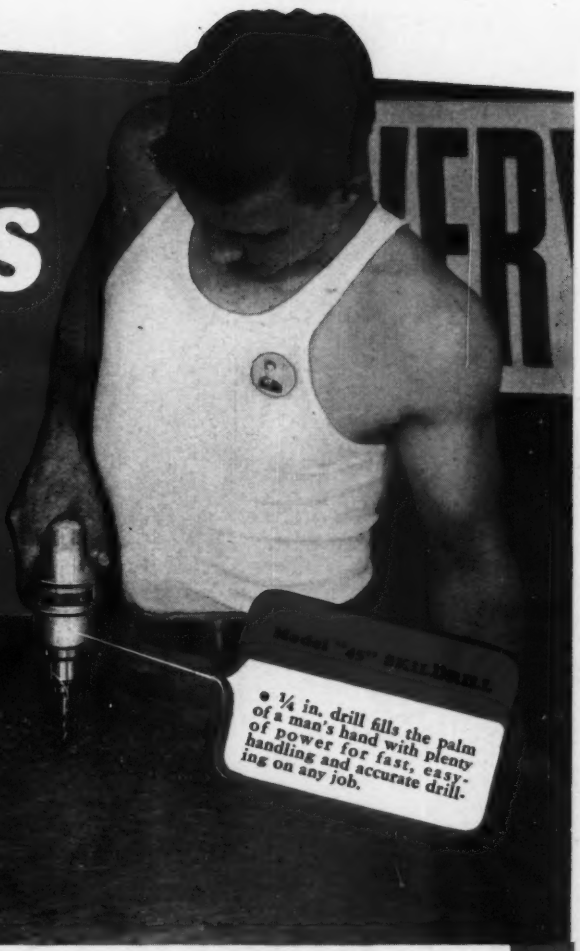
AIRTEMP DIVISION OF CHRYSLER CORPORATION • DAYTON, OHIO

Tune in Major Bowes every Thursday, C. B. S., 9 p. m., E. W. T.

So Light . . .
So Compact . . .
So Powerful!

SKILDRILLS

ARE FAVORITES
FOR FASTER DRILLING
EVERYWHERE!



Model "90" SKILDRILL
• Lighter, more compact, easier to handle than any other ¼ in. drill made. Preferred for all repair and maintenance work.

Model "45" SKILDRILL
• ¼ in. drill fills the palm of a man's hand with plenty of power for fast, easy-handling and accurate drilling on any job.

Model "47" SKILDRILL
• ¼ in. drill similar in size and design to Model "45" . . . has even greater power for greater drilling speed under load.

For every drilling job you have in assembly and installation work, there's a SKILDRILL that will do it better and *faster!* The ¼ in. SKILDRILL handles as easy as pointing a finger, gets in anywhere a fist will fit. The ½ in. SKILDRILL packs more power into less weight and space than any other drill made . . . drills more holes in less time in closest quarters. That's why SKILDRILLS are the leaders of the whole drill field!

SKILDRILLS are made in 4 models . . . ¼ in., heavy duty ¼ in., ⅜ in., and ½ in. capacities . . . all typical of the rugged quality built into the entire line of SKILSAW DRILLS. Let your distributor demonstrate these faster-working drills today.

ARMY-NAVY "E"

SKILSAW, INC.
5029-A Elston Ave., Chicago 30, Ill.
Sales and Service Branches in All Principal Cities

SKILSAW PORTABLE ELECTRIC TOOLS
MAKE AMERICA'S HANDS MORE PRODUCTIVE

"I ASKED YOU TO DESIGN A MODERN POSTWAR HOUSE, BUT THESE PLANS SHOW CHIMNEYS!"

Yes, Mr. Homeowner, the postwar house will have chimneys in spite of the postwar pipe dreamers and their wild-eyed predictions of revolutionary changes in every kind of product.

Even after the war people will continue to suffer from cold in winter. Therefore, our prediction is that they are going to keep on needing heating equipment... which means they will burn fuel of some kind. So, at least for some time after the war, chimneys will continue to form part of our national sky line.

Of course, natural progress is going to bring important improvements in design and principle of heating and air conditioning units . . . the same as in everything else. But sweeping, revolutionary changes are not going to come so fast as to blow your hat off.

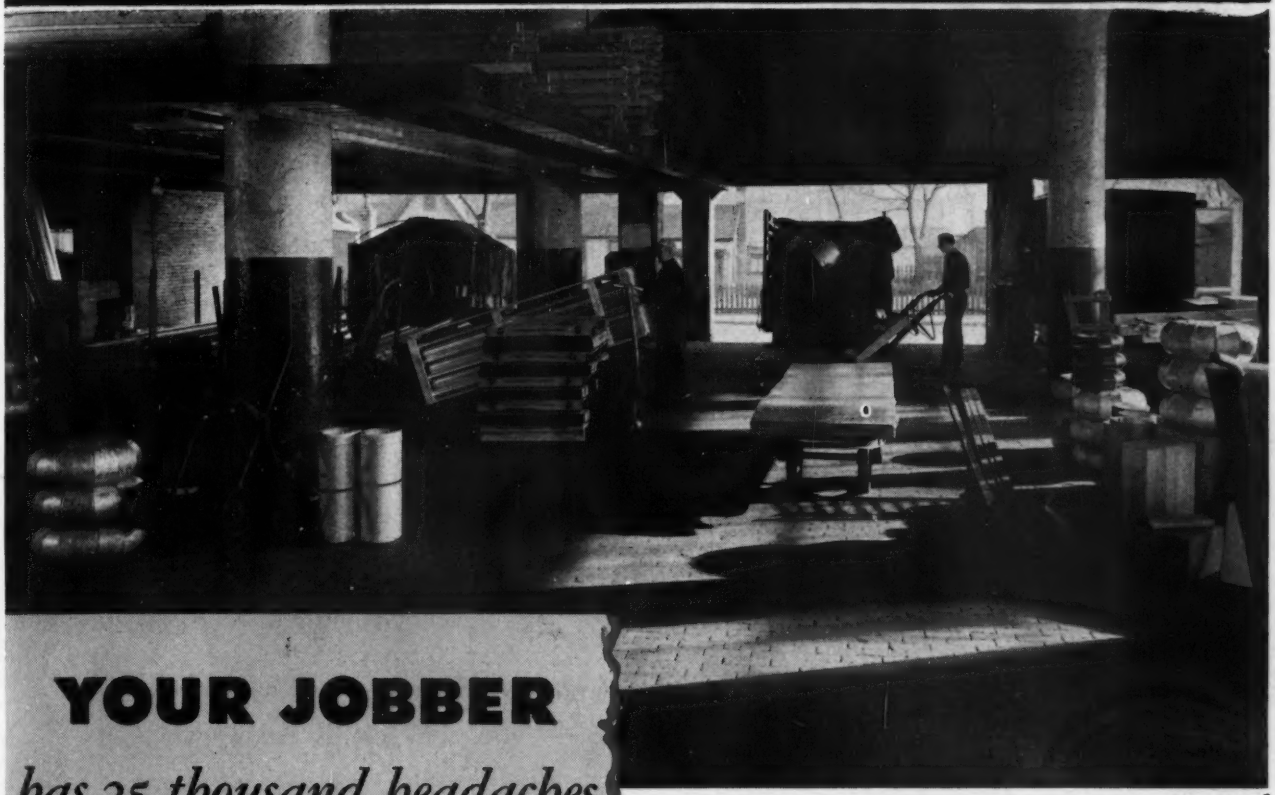
RYBOLT engineers realize this fact and are keeping their feet on the ground. At the same time they are definitely developing vital new features and refinements that will make RYBOLT postwar products better than ever before . . . heating and air conditioning units you'll be proud to sell and your customers will be eager to buy.

BUY MORE WAR BONDS!

THE RYBOLT HEATER COMPANY

615 MILLER STREET ★ ASHLAND, OHIO

VIKING'S POST WAR PLANNING FILE FOR DEALERS



YOUR JOBBER

has 25 thousand headaches

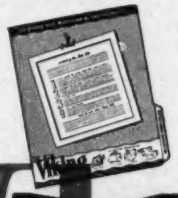
and the Key to Your Post War Sales in his hand!

★ If you figure an average jobber stock of 8500 items and sizes and three problems per item, the rest is simple. What line should I stock, what sizes do I need, what price should I pay. Actually there are many more than three problems, and for each jobber, each problem has its own relative importance. These are peacetime headaches.

In wartime, though, and in reconversion periods your jobber rates some sympathy. He will get merchandise first in most cases. But how and where and when is he to apportion it? For a fact he'll get merchandise first from Viking. Just as soon as possible, jobber orders taken now will be filled and shipped. This advance order-taking for later delivery will be the case with many a manufacturer. So take the tip from your good business friend, the jobber — renew your own good supplier contacts now.

Get together with your jobber

It pays to be friendly with him. Learn his ideas about merchandise and when it may come through for him, let him know what you think your needs may be, keep in touch with him regularly so as to be right there when he gets Viking blower, fan and humidifying equipment to sell. ***You'll profit from it in a large way!***



IT'S FREE Now is the time for action. The first data sheets in the Viking Post War Planning and Selling File are ready for you. Dealers shown the first data sheets have immediately asked to be added to the list so as to get all the others. This file is a useful, practical guide for dealers who care about their future. Of course it isn't perfect. But we've tried to make it genuinely helpful. Why not send for it now and see for yourself? It may help you too.

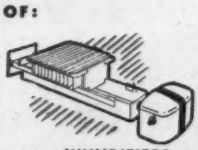
Viking

IN PEACETIME, PRODUCERS OF:

VENTILATORS

ATTIC FANS

BLOWERS



HUMIDIFIERS

AIR CONDITIONING CORPORATION • 5600 Walworth Avenue • Cleveland 2, Ohio

CHOOSE THE NO. 1 BLOWER WHEEL !

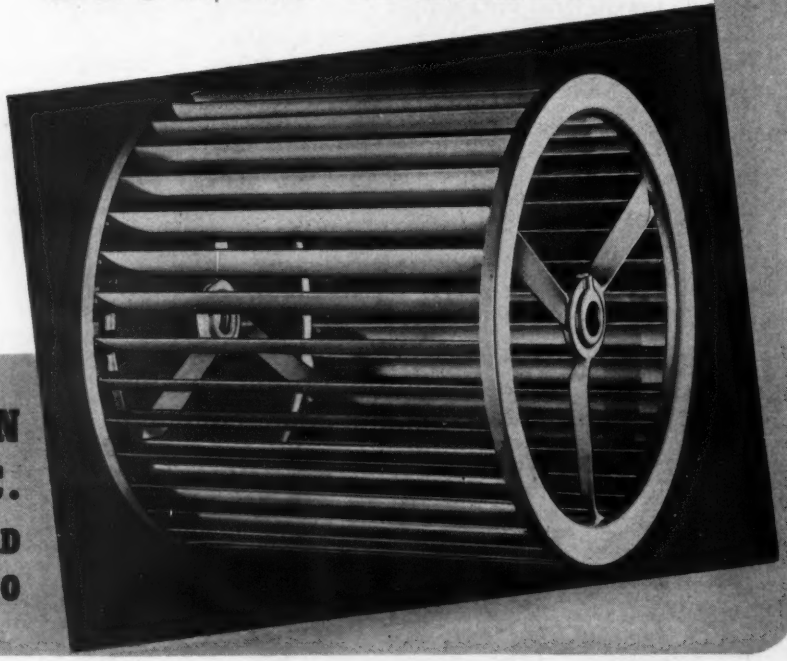
IN THE RACE for present and post-war heating and air conditioning business — choose the No. 1 Blower Wheel.

Morrison Airstream Blower Wheels are scientifically designed and fabricated with patented 3-piece construction that makes them more rigid and stronger, yet — lighter in weight.

Compare Airstream Wheels with any other design! Airstream's advantages are quickly discernible — and the cost is below expectation.

Plan now to consult Morrison Engineers on your every blower wheel problem. They will gladly show you how you can build your own blower assemblies — much to your advantage.

Airstream BLOWER WHEELS



Here is an Airstream Wheel—30-40% lighter, fabricated on automatic equipment and spot welded.

MORRISON PRODUCTS, INC.
16816 WATERLOO ROAD
CLEVELAND 10, OHIO

Century open protected squirrel cage motor. Now available from 2 to 15 horsepower.

15 horsepower, splash proof, squirrel cage, induction motor. For installations requiring protection from falling objects or plant wash-downs.

5 horsepower, totally enclosed, fan cooled, squirrel cage motor. For installations requiring protection from dirt, or explosive grain dust.

15 horsepower, explosion proof, squirrel cage, induction motor. For installations requiring protection from Class 1 Group D gases.

CENTURY Offers You CORRECT MOTOR PROTECTION For Every Type of Application

● Whatever the conditions under which the motor must operate, whether for indoor or outdoor installations, there is a Century Motor designed and engineered to provide proper motor protection against all types of surrounding atmospheres.

Century Open Protected General Purpose Motors are designed and engineered to minimize the possibility of dripping water or solid objects entering vital motor parts. With standard insulations these motors also resist the action of mild acids and alkalies, normal moisture, and abrasive dusts. Century special insulations are available for higher concentrations of acids, alkalies, or steam.

Century Splash Proof Motors are engineered for use in motor applications exposed to frequent wash-downs with a hose. They are storm-proof for outdoor installations exposed to rain or snow. Special insulations are available for unusual acid or alkali-laden atmospheres.

Century Totally Enclosed Fan Cooled Motors are intended for applications in machine shops or other places where they are exposed to abnormal amounts of coolant fog or spray combined with dusts and it is necessary to protect the motor against such atmospheres.

Century Explosion Proof Motors are protected against explosive, dust-laden atmospheres or atmospheres containing many of the explosive gases. They carry Underwriters' label for Class II, Group G, and Class I, Group D hazards, respectively.

Your nearest Century Application and Service Engineer will gladly give you complete details. He's always at your service — call him in.

CENTURY ELECTRIC CO.
1806 Pine Street St. Louis, Missouri
Offices and Stock Points in Principal Cities

305

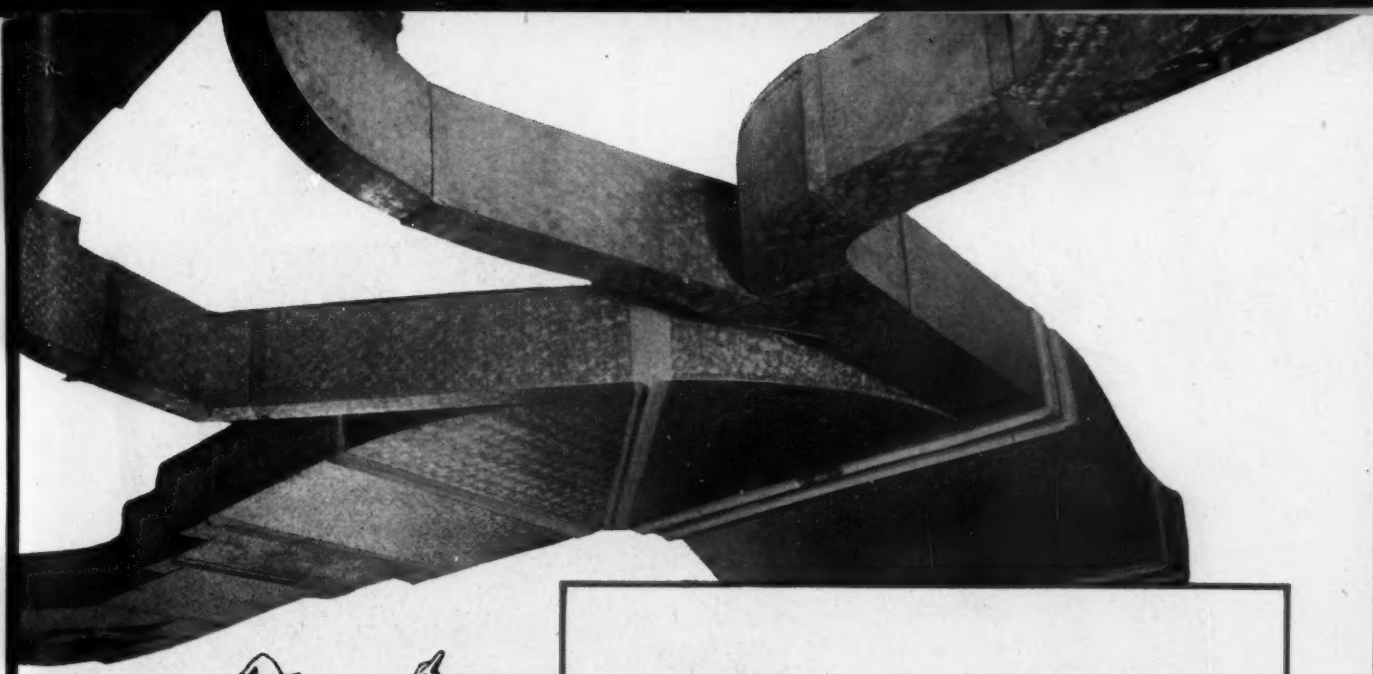
One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World.

They will return when Victory has been achieved, and the production of SUNBEAM Warm Air Equipment again becomes a normal activity. Now the job of our SUNBEAM Plant is the production of magnesium castings for planes.

We look forward to the day when we shall again direct all our energies to the things and activities we knew. Supplies and materials now non-existent will then be obtainable as before, and commercial relationships suspended by the war shall be restored.

Our plans today do not call for nor contemplate any change in our pre-war method of distributing our products.

AMERICAN RADIATOR & Standard Sanitary
New York CORPORATION *Pittsburgh*



WHAT IS GOOD MATERIAL WORTH TO A JOB?

Have you ever considered what good material is worth to the value of a finished job? Every good sheet metal job well done becomes a silent salesman for you. But that is only a part of the satisfaction in using good material and good workmanship. It invariably means actual economy to you as well as to your customer who pays the final bill.

The importance of workability has long been recognized by Continental metallurgists, and they have worked to perfect a sheet for the man on the job. That they have succeeded in producing galvanized sheets with a high degree of workability is attested by the wide popularity of Superior trademark sheets. These sheets solder well, handle well, and are highly uniform. Their "clear-through" quality helps you turn out easier, faster work and make satisfied customers.

Ask your jobber about future supplies of Continental and Superior steel sheets.

CONTINENTAL STEEL CORPORATION, KOKOMO, INDIANA — THE SUPERIOR SHEET STEEL CO., CANTON, OHIO

THE SUPERIOR SHEET STEEL CO. TRADE MARK S REG. U.S. PAT. OFF. CANTON, O.

CONTINENTAL STEEL CORPORATION ★ SUPERIOR STEEL SHEETS

THE SUPERIOR SHEET STEEL CO. COPPER STEEL COPPERIOR SHEETS CANTON, O.

SUPERIOR

CONTINENTAL STEEL CORPORATION

Want to be Surprised?
...THEN LEARN HOW LITTLE IT WILL COST TO RUSTPROOF ANY OF THESE POSTWAR HOMES
First of all, what would you guess to be the extra cost of rustproofing an average 6 or 7 room house including:
Anaconda Copper Tubes for both hot and cold water lines.
Copper for roof and chimney flashings, ridges and valleys.
Copper for rain gutters and downspouts.
Bronze Wire for screens.
Five hundred dollars? Three hundred dollars? Well, get set for a surprise! Because two hundred dollars will more than cover the extra cost of these durable metals... and in many houses of simplified design the extra cost might be even less than one hundred dollars.
And here is what you will get in return: Water pipe that cannot rust to stain the water or reduce the flow. Flashings and valleys that will give lasting roof protection against water leaks around chimneys, gables, etc. And screens, gutters and downspouts that can be depended on for years of trouble-free service.
When the red metal gets the green light...
Today, war needs get first call on all copper and brass. But when conditions permit, time-tested Anaconda Copper, Brass, Bronze will be ready for home builders in many forms of usefulness...including plumbing, sheet metal work, decorative trim and hardware of enduring service and economy.
4414
THE AMERICAN BRASS COMPANY
Subsidiary of Anaconda Copper Mining Company
General Offices: Waterbury 88, Connecticut
In Canada: ANACONDA AMERICAN BRASS, LTD., New Toronto, Ont.
COLONIAL TYPE
GEORGIAN TYPE
CAPE COD TYPE
MODERN TYPE
Anaconda Copper & Brass

Farsighted home builders will call for Copper!

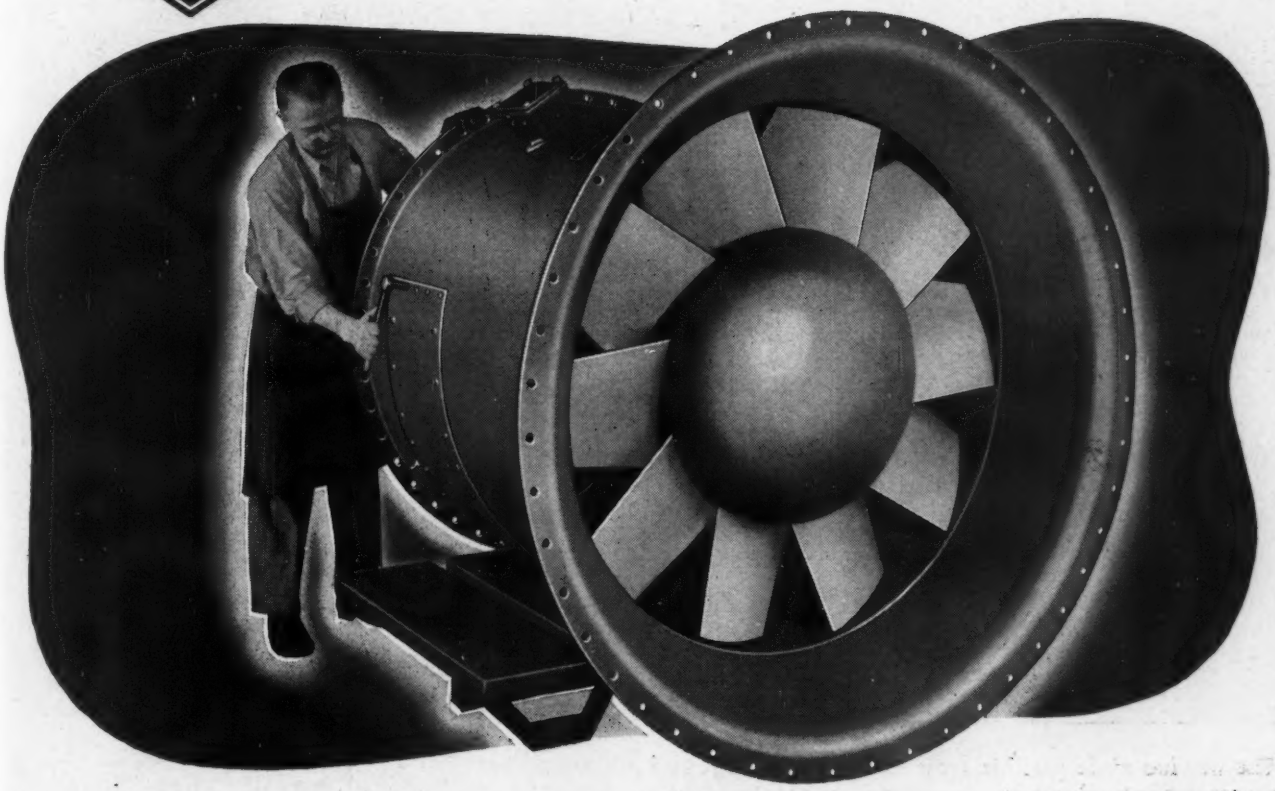
• The best of tomorrow's homes are being planned *today*. And Anaconda messages such as this in Better Homes and Gardens and American Home are selling thoughtful people on the kind of jobs you will be doing for them tomorrow.

• These preferred prospects will want the lasting protection and freedom from house repairs that only copper . . . roofing, flashings, gutters and downspouts can give them. When you recommend Anaconda Copper, you protect their comfort and your reputation.

4448

Ask Any Marine Engineer About

ILG AXIAL-FLOW FANS



. . . and you'll get an "earful" of warm praise! For these *extra*-rugged "man-size" ILG Axial-Flow Fans have established an enviable reputation aboard ship for stamina, for highly efficient operation, for unrivaled ease of installation and maintenance. Sensibly designed, soundly engineered, available in a wide range of sizes and capacities, you will find many uses for this ILG line in your post-war plans requiring air moving equipment in duct mounting for vertical or horizontal operation. Models for industrial and commercial use are not available at present, because Uncle Sam's needs come first. But soon, we hope, announcement can be made of models for *your* use. Watch for it.

ARMY E NAVY

ILG **VITALIZED VENTILATION**

AND AIR CONDITIONING

free

88-PAGE ILG-BOOK

SEND COUPON TODAY!

Suggestions on designing propeller fan and blower installations . . . problems solved in 48 installations. Regularly $1.00 per copy . . . *free* if you clip coupon to your letterhead.

ILG ELECTRIC VENTILATING CO., CHICAGO 41, ILL.

2871 North Crawford Avenue, Offices in 38 Principal Cities

☐ Send FREE copy of new "ILG-BOOK"

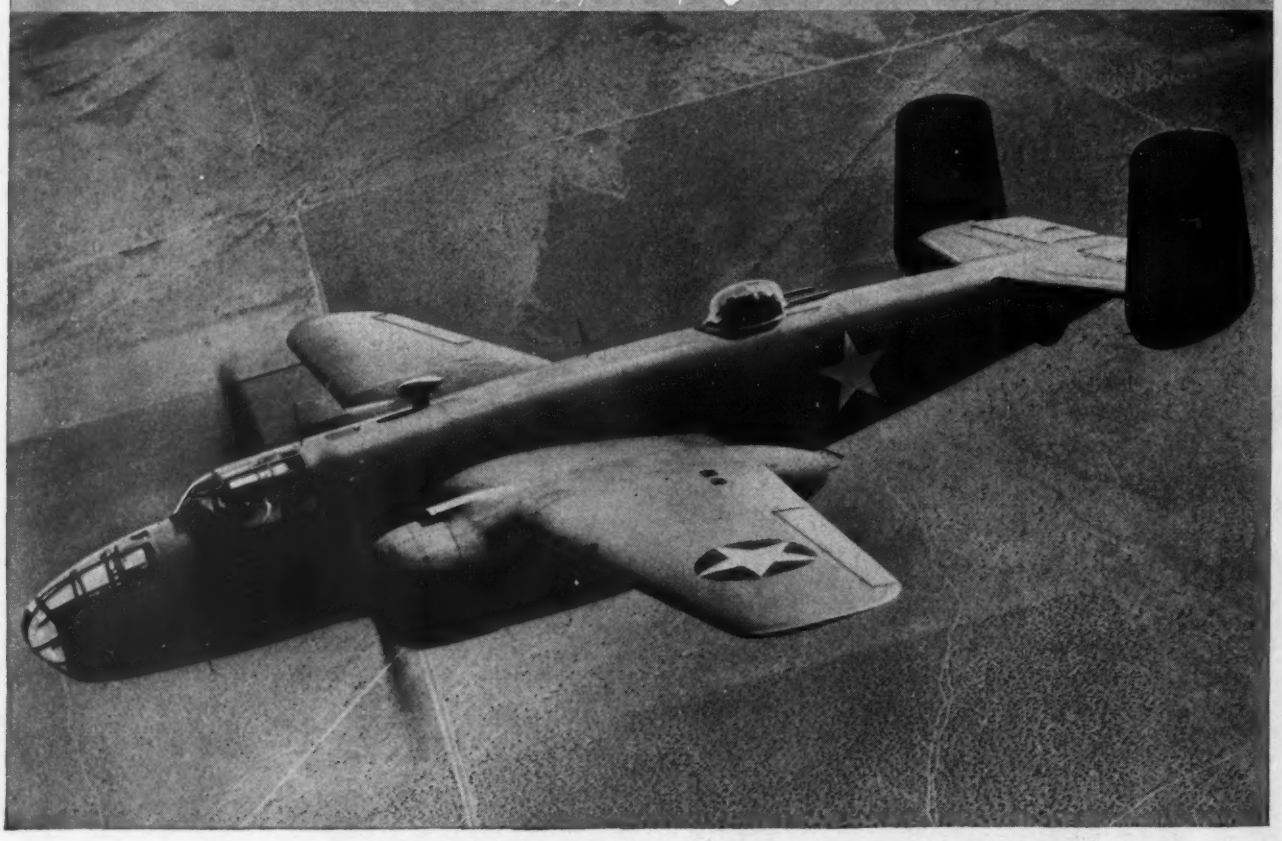
*Firm Name*_____

*Individual*_____ *Title*_____

*Street*_____ *Zone*_____

*City*_____ *State*_____

EVER SEE A "SPIDER" With Wings?



The war has made possible great advances in our thinking, our processes, our products. Whoever thought a "bazooka" would annihilate tanks... that a truck could swim like a duck . . . or that a discarded aluminum frying pan could be melted down, refined and become fabricated into precision parts of a glorious flying fighting machine!

Today, thanks to careful segregation of scrap, advances in technical knowledge and precision control of processes, the smelter is producing aluminum ingot of exceptional qualities. Aluminum from smelters is used in planes, tanks, guns, navigation instruments, aerial radios, cameras, engines and many other vital units of our war machine. Federated aluminum ingots will meet your requirements and save you money.

Consulting service available through your nearest Federated office.

PRODUCTS PRODUCED BY FEDERATED METALS

ALUMINUM
BRASS
BRONZE
DIE CAST ALLOYS
SOLDER
BABBITT
TYPE METAL
ZINC DUST

All of these in all commercial forms—Special Alloys to your specifications.

NOTE: *If you are under the impression that ALUMINUM is not permitted in* your *product, refer to WPB's October 28th amendment M-1-i. Restrictions are relaxed and the fabrication from secondary aluminum of many other items not originally allowed is now made possible.*

FMD

Federated

METALS DIVISION

AMERICAN SMELTING and REFINING COMPANY

120 BROADWAY, NEW YORK (5) N. Y.

Nation-wide service with offices in principal cities

LUXAIRE

WILL MEET THE *Challenge*

SERIES 600

THE new, enlarged Luxaire plant at Elyria, Ohio is well prepared to meet the challenge that faces the warm air heating industry in the post-war period.

The great demand for the special war-waging equipment produced in the Luxaire plant has made necessary an increase of more than 100% in manufacturing space—and has made necessary the addition of considerable new machinery that increases production, efficiency and quality.

The knowledge and experience gained in fabricating weapons of war already are being applied to the fabrication of furnaces.

The immediate challenge to be met after the war is the call for better furnaces, and more furnaces.

Furnace dealers and manufacturers alike must be able and ready to supply and satisfy new demands and greater demands.

The procession of heating progress will not stop, so that laggards can again resume their places in line.

The post war heating market is a momentous challenge to ingenuity, adaptability and manufacturing efficiency.

LUXAIRE welcomes this challenge!

BUY MORE WAR BONDS AND STAMPS

Luxaire

WARM AIR FURNACES . . . AIR CONDITIONING UNITS . . . COAL . . . GAS . . . OIL

THE C. A. OLSEN MANUFACTURING CO., ELYRIA, OHIO

TODAY...

Manufacturing for our government, and essential civilian use, we are meeting war-vital schedules with air-conditioning equipment built to exact specifications.

Tomorrow, manufacturing for you, we will deliver air-conditioning equipment that will be competitive in design, performance and price.

UNITED STATES AIR CONDITIONING CORPORATION

NORTHWESTERN TERMINAL • MINNEAPOLIS, MINNESOTA

Weiralead

LEAD ALLOY COATED SHEET

High performance in deep draws

Weiralead is a hot dipped product with an exceptionally tight uniform coating. It takes deep severe draws without flaking or peeling, has definite die lubricating advantages and provides an excellent base for paint, lacquers or varnish. The strength and ductility of the steel base sheet and the uniformity of the coating are in accordance with Weirton's Quality Standards . . . Weiralead is already extensively used in ammunition box liners, air cleaners, automobile radiator shells, mouldings, precipitron deposit plates, meter boxes, cabinet separators, lantern parts, radio condenser shells, can spouts, conductor pipe elbows, drawn auto filters, and automobile and truck muffler shells . . . Write for a sample of Weiralead and complete information on it. It may be your answer to a tough drawing problem.

WEIRTON STEEL CO.

WEIRTON, WEST VIRGINIA *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION** *Executive Offices, Pittsburgh, Pa.*

Congratulations

ON A FINE JOB, WELL DONE!

THE Treasury "Star" Flag—the bond-buying counterpart of the Army-Navy "E"—marks plants with at least 90% of personnel participating in the Payroll Savings Plan to at least 10% of gross payroll, *and also having reached, or topped, a War Loan Drive quota!*

The successful close of the 4th War Loan Drive finds many more "Star" Flags than ever before flying over the industrial plants of America. To all these, go the heartiest thanks of the nation, and the deep appreciation of the Treasury Department for a great job! And to those who may not quite have qualified for the "Star," go equally sincere thanks—and the confidence that soon they, too, will join the ranks of the "Star" fliers.

One thought that many concerns have found helpful in stepping up the intake from their Payroll Savings Plans is this. In many cases the Treasury Representative in a plant has been able to point out the fact that during *Loan Drive periods* the employees have found it possible to spare much more than they had counted on when setting up their original subscription, and that—*when properly approached*—a very substantial fraction of such employees will decide they can well afford a distinct increase in their current Payroll Savings Plan.

Talk this over with your Treasury Representative—it offers important possibilities when correctly handled. And again accept the Treasury Department's congratulations for your fine work in helping to put over the 4th War Loan.

LET'S **ALL** KEEP
BACKING THE ATTACK
WITH **WAR BONDS**

The Treasury Department acknowledges with appreciation the publication of this message by

AMERICAN ARTISAN

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council.

The complete acceptance and development of
A·R·A
SHEETS
as an alternate or substitute for sheet metal is due to the wholehearted and determined effort of the Sheet Metal Trade to quickly and effectively adjust themselves to an "All Out" Defense effort.
We too have left no stone unturned, no facility overlooked and no effort spared to give our full cooperation.
The tremendous quantity of A-R-A Sheets being used the nation over stands as testimony of a product developed and a service rendered in keeping with the War demands.
FLAT
ROUND
RECTANGULAR
SQUARE
FITTINGS
READ IT and know!
WHY
A·R·A SHEETS are Preferred

BY THOUSANDS OF TRADESMEN IN THE HEATING, VENTILATING AND AIR CONDITIONING FIELD IN FABRICATING DUCT WORK AND INTRICATE FITTINGS.

A.R.A. Sheets are WORKABLE, easy to cut with a pair of snips, easy to ROLL into round pipe the same as you would sheet steel. This one man sheet is light weight. The large A.R.A. sheet 33" x 48" contains 11 square feet—and it weighs only about 5 pounds.

A.R.A. Sheets are moisture-proofed, smooth, clean, strong, and attractive neutral color finish, capable of withstanding hard usage. You can depend on every square foot of A.R.A. Sheets as being uniform and of the highest quality.

Asbestos clad A.R.A. Sheets are tough yet flexible—rigid but not brittle—fire-proofed and water-proofed—will not dry out, crack, crumble, or chip, have a high insulating value (K. .45 B.T.U.) and good sound deadening properties, no metallic rattle.

These are only a few of the highlights and reasons why A.R.A. Sheets are preferred. The full story is illustrated in the A.R.A. booklet. We will gladly send it to you on request. (Imprinted for jobbers.)

The complete acceptance and development of A.R.A. Sheets as an alternate for sheet metal is due to the wholehearted and determined effort of the Sheet Metal Trade to quickly and effectively adjust themselves to an "All Out" Defense effort.

The tremendous quantity of A.R.A. Sheets being used by the Trade, the nation over, stands as testimony of a fine product developed and a service rendered in keeping with the current War demands.

CARTON CONTENTS

20 Sheets 33"x48" Per Carton
40 Sheets 16½"x48" Per Carton

SHIPPING WEIGHT
Approximately 100 lbs. per Carton

SHEET THICKNESS
Approximately 3/16" thick

GET GENUINE A.R.A. SHEETS FROM YOUR JOBBER

Write today for the free 16-page illustrated booklet No. 89-A

Here is the package of A.R.A. Sheets that make it the most convenient sheet to ship, stock or carry on the job. The Sheets are always clean and in good condition.

ZONE NUMBER 24

4101 WEST TAYLOR ST. GRANT WILSON, INC. CHICAGO ILLINOIS

YOU'LL BE THE
MERCHANT OF COMFORT
IN TOMORROW'S HOMES

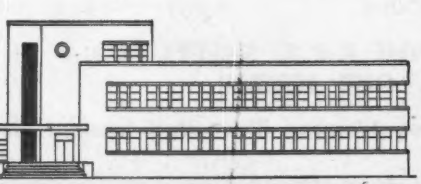
As a heating dealer you face big opportunities in the post-war period.

New ideas are stirring the industry. New products are being readied which will establish new standards of heating comfort, efficiency, economy. You will profit by providing these products to the new markets they will open—for new homes and to meet the vast replacement needs.

Automatic control will be more important than ever in establishing the new standards of heating comfort. As a producer of controls for all heating systems and all fuels Penn, too, is preparing for the post-war period. Without detriment to our present work for the armed forces, Penn engineers are embodying the results of new research and scientific advancements in a line of heating controls worthy of Penn's reputation for accuracy and dependability.

To insure customer satisfaction—the kind that builds good will, increases sales aud profits—you can depend on Penn controls, now and in the post-war market. Penn Electric Switch Co., Goshen, Indiana. In Canada: Powerlite Devices, Ltd., Toronto, Ontario.

PENN



I.C.I.

AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

HUSSEY

COPPER

HELPS WIN THE BATTLE ON EVERY FRONT

Ready..

TO HELP YOU WIN BACK POST WAR MARKETS

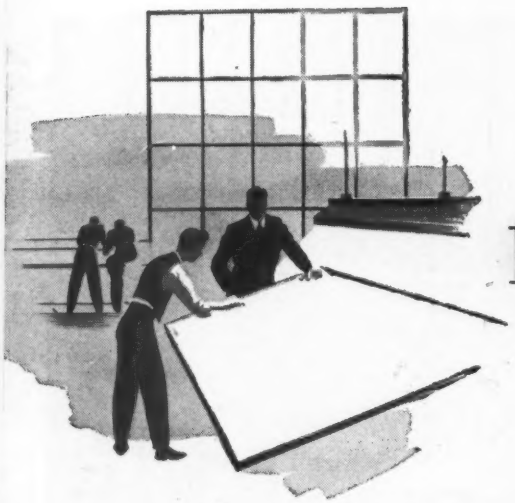
"The Nation able to supply the greatest quantity of Copper will be Victorious"—for no wars could be fought nor won without Copper. That is why Copper is known as the *Victory Metal*. We in America have proven to the world that we can supply Copper in the huge quantities needed to decisively win this, or any other war in which America becomes involved! Today, our production resources are working 100% for America and her Allies, and Hussey engineers are putting to good use the "know-how" gained through the terrific pressure of a world at war—in planning for *your* post-war Copper applications.

C. G. HUSSEY & COMPANY

(Division of Copper Range Co.)

Rolling Mills and General Offices: Pittsburgh, Pa.

Warehouses in Principal Cities



HERMAN NELSON PRODUCTS

in post-war building

Since our country started preparations for this war, the building industry has made every sacrifice needed to achieve victory. Until the peace has been won, this industry will continue its efforts in that direction.

However, architects, engineers, contractors and manufacturers are looking forward to post-war achievements. All of them are thinking about city planning, slum clearance, more efficient manufacturing buildings, stores designed for better merchandising, and schools which serve the entire community. Many are actually doing something about it.

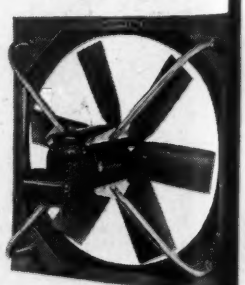
The Herman Nelson Corporation has also been busy manufacturing war products. As long as the war lasts our facilities will be available for the needs of our armed forces.

However, we have not lost sight of the fact that we are fighting for peace — a peace which will permit the building of a better nation, larger airports, more comfortable homes, more attractive theatres, more inspiring churches. We are not only thinking about this building. We are continuing to improve our products, looking for new uses and applications for them and developing new products. We want to cooperate with the building industry in heating and ventilating their post-war projects.

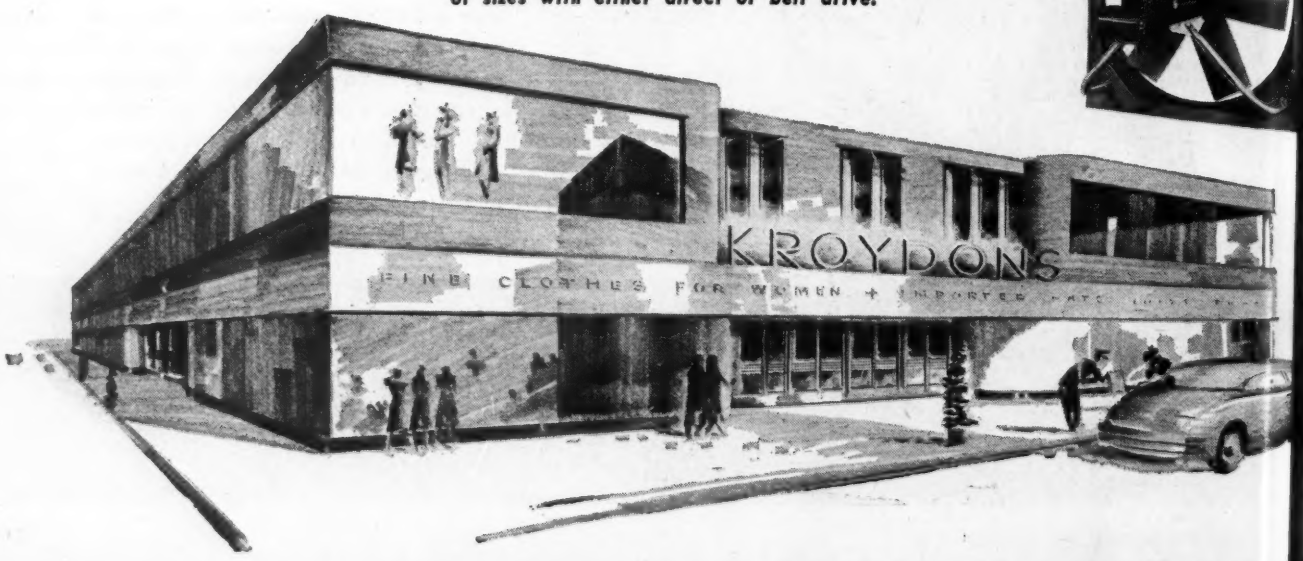
THE HERMAN NELSON CORPORATION

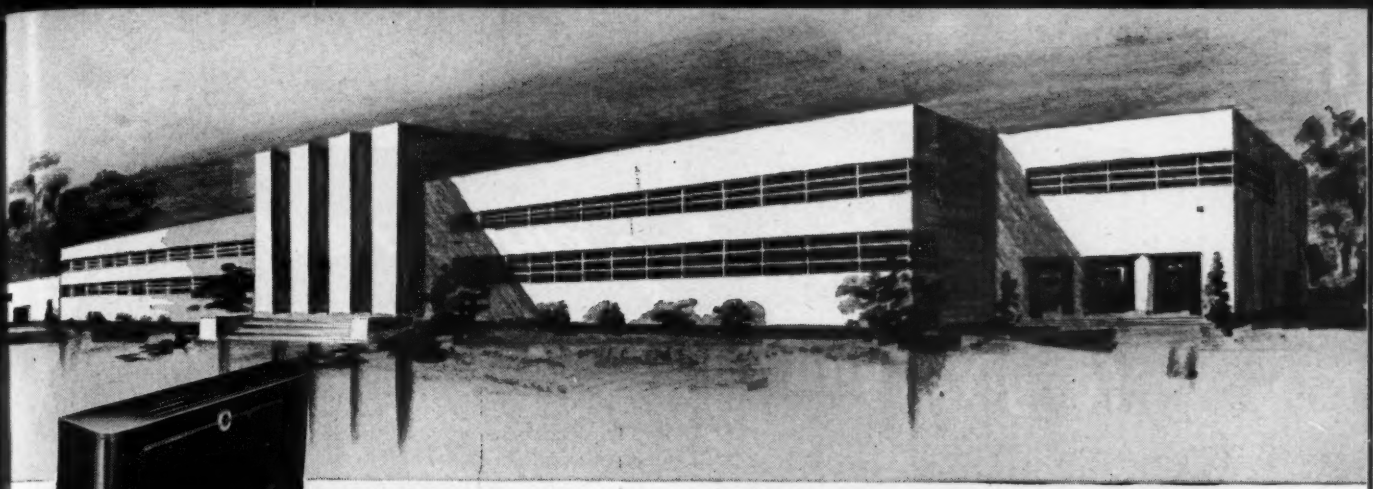
MANUFACTURERS OF QUALITY HEATING, VENTILATING AND AIR CONDITIONING PRODUCTS

MOLINE, ILLINOIS

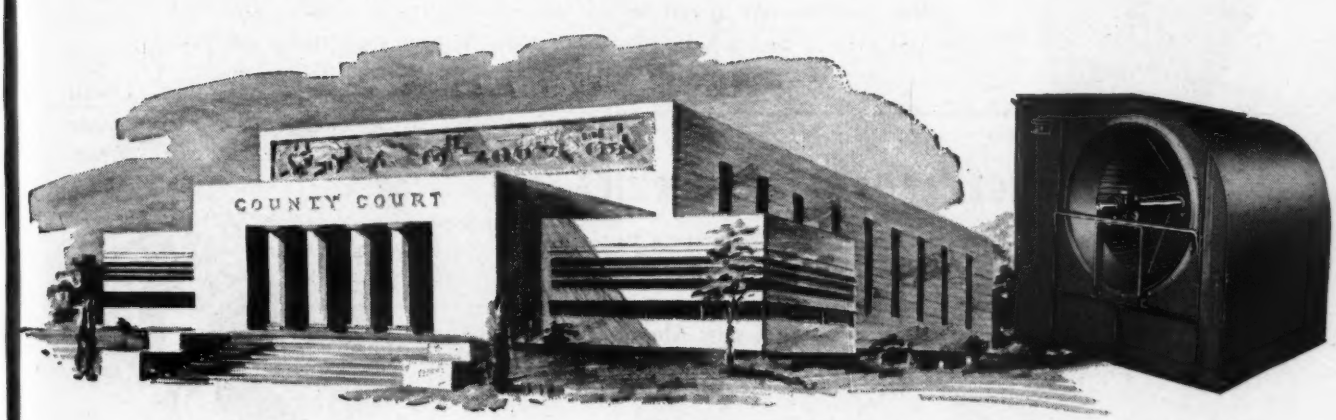


Commercial buildings of all types present many ventilating problems which can be solved with Herman Nelson Propeller Fans. These fans are available in a wide range of sizes with either direct or belt drive.

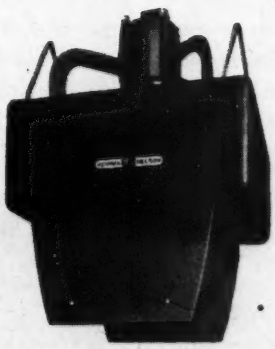




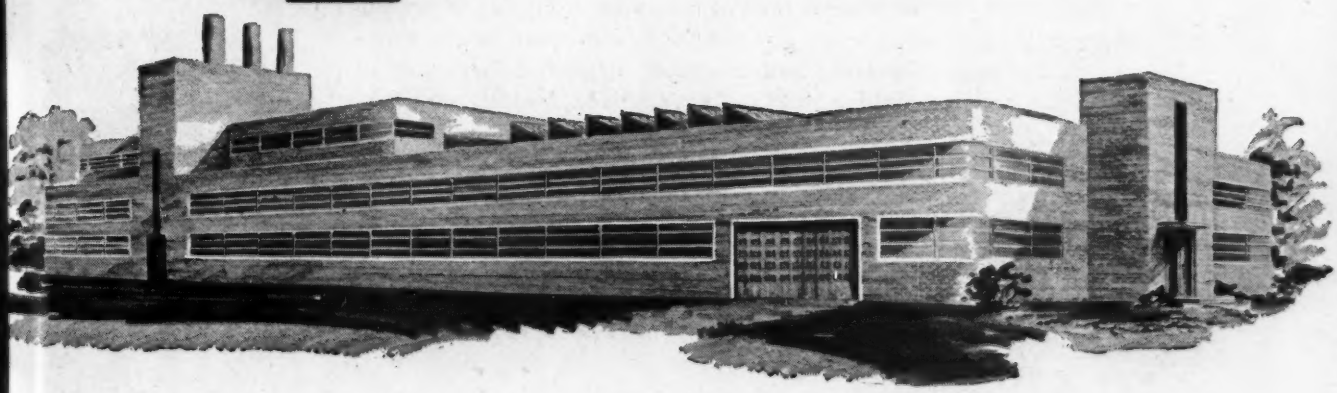
Herman Nelson is the leading manufacturer of Unit Ventilators for schools. For over twenty-five years Herman Nelson Unit Ventilators have been maintaining proper air conditions for the protection of school children's health and comfort.



Heating, ventilating or air conditioning systems in public buildings require large blowers. Herman Nelson manufactures blowers with capacities ranging up to 300,000 CFM. They are available with either forwardly or backwardly curved blade wheels.



Unit Heaters are recognized as the most efficient and economical method of heating industrial buildings. Herman Nelson Propeller Fan Unit Heaters are manufactured in both the horizontal and vertical shaft type.



He's straining every nerve to give you SHEET STEEL SERVICE

The Armco Distributor is in the same fix as many others. He can supply just so much sheet metal (his quota limitation); he's up against the same manpower shortage; and he can't provide quickly all the sheets he'd like to *plus* the valuable shop services he offered before the war.

But don't hesitate to call on him because he'll try to handle your order —and even if he can't he may have some helpful suggestions for you.

A STRONGER POST-WAR SERVICE

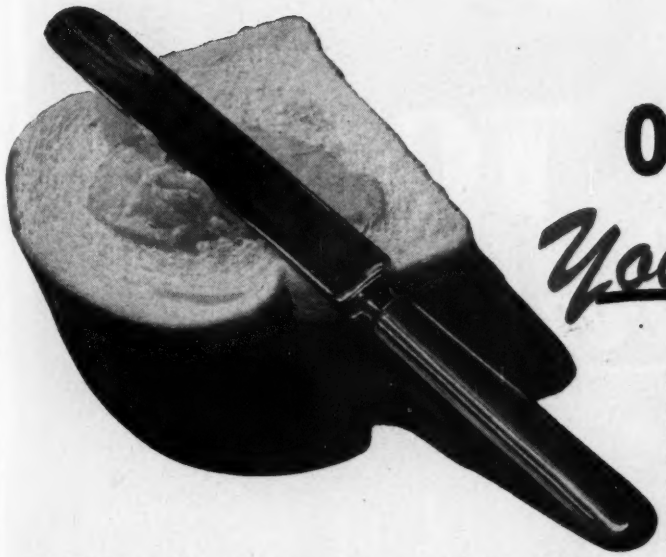
Right now the Armco Distributor is planning better things for you. First, the most complete line of sheets in the industry —galvanized ARMCO Ingot Iron; galvanized PAINTGRIP; ZINCGRIP; ZINCGRIP-PAINTGRIP; Stainless Steels; Aluminized Steel; Enameling Iron; copper-bearing and regular steels.

Second and no less important, he again will give you a free subscription to *Armco Shop News,* a monthly paper full of useful information; all kinds of handy shop-practice booklets; shop and job signs; blotters and business-getting postcards, sales and collection letters and newspaper advertisements—just about everything you need to run a successful business.

So whether it's now or after the war, remember the Armco Distributor wants to serve your shop to the limit of his ability. Every day brings him nearer to the time when he can give you the ALL he wants to give you—in iron and steel, cooperative business-getting services, deliveries, or all three. The American Rolling Mill Co., 1031 Curtis St., Middletown, Ohio.

SPECIAL PURPOSE ARMCO SHEET METALS

ARMCO DISTRIBUTOR SERVICE



On Which Side is *Your* Bread Buttered?

In this heating business there is a lot of "live and let live" involved. Every day the contractor-dealer needs some material or service in a hurry. The nearby Wholesale Distributor offers the handiest source of supply. His stockroom and his truck often save valuable workmen's time and materially help to get the job done on promised schedule.

These facilities and services are fully appreciated by successful heating dealers. They use the Wholesale Distributor as a source of supply for the *major* units involved as well as the little items. They rely upon him to supply the furnaces and boilers as well as the accessories needed.

Viking Believes in Wholesaler-Dealer Distribution . . .

The Viking Manufacturing Corporation, makers of a complete line of heating, cooling and allied equipment to meet every requirement, has a definite distribution policy. *We sell only through* Wholesale Distributors!

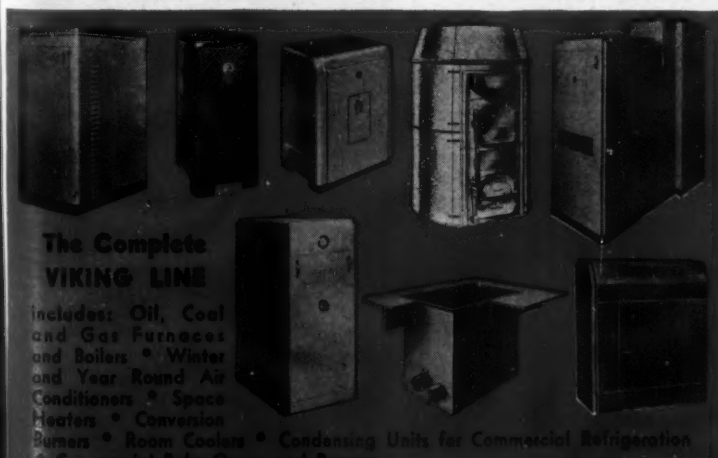
Viking Distributors—by reason of volume buying—enjoy a rock-bottom delivered cost which allows re-sale to dealers at a figure in line with the dealer prices any manufacturer can quote direct. Volume buying on the part of the Wholesale Distributor effects liberal savings and economies which he generously shares with his dealers, enabling them to meet—*and often beat* —the prices of so-called "direct" dealers.

This practice permits your Viking Wholesale Distributor to maintain the facilities you need to better handle your jobs. Materials and unit inventories, service and delivery facilities, showrooms and engineering and financing assistance make him a valuable ally.

There is no real cost advantage in trying to do a retail business direct with any factory. After many successful years in the heating and cooling business we can assure the retailer that from all angles, he is in a better competitive position under the Viking Wholesale Distributor to Dealer plan.

DISTRIBUTORS:

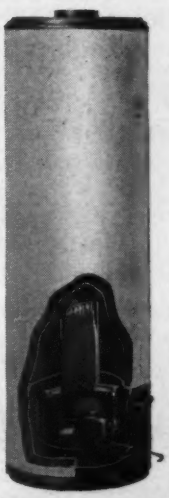
We have an interesting, exclusive franchise proposition for present open territories. It is tailored to fit into the sound postwar planning of aggressive wholesalers. Let us tell you about it.


The Complete
VIKING LINE
includes: Oil, Coal and Gas Furnaces and Boilers • Winter and Year Round Air Conditioners • Space Heaters • Conversion Burners • Room Coolers • Condensing Units for Commercial Refrigeration • Commercial Bake Ovens and Ranges.

VIKING EQUIPMENT offers year round sales opportunities

Viking dealers are in a preferred position—both now and postwar—with this unusually complete line of heating, air conditioning and allied equipment to draw from. Many of these units are now in production and shipments are being made with reasonable promptness on orders acceptably rated under current government regulations.

This Viking Oil-Fired Water Heater, for example, is one of our current volume items. Write us for full details and our complete catalog; and name of the Viking distributor nearest you.



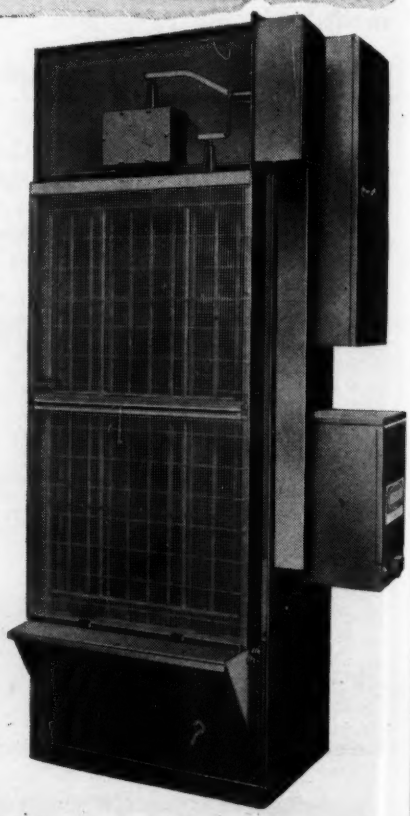
The **VIKING** Mfg. Corporation, U. B. Bldg., Dayton 16, Ohio

1,950 tons of soot—is a lot of soot—and our artist figured it would take a lot of smoke stacks, as you can see, to belch out that much every month per square mile area—but actually it does happen during the heating season right in Pittsburgh.* Baltimore isn't far behind with 1,430 tons and so on through the list of all big U. S. industrial centers.

These figures tell a graphic story of atmospheric dust and soot pollution that only adequate air filtration equipment can remedy.

A high percentage of the soot content of the air is removable with mechanical filters—but the finer particles such as smoke for example, and the even finer microscopic dust particles normally invisible, must be electrically precipitated to be arrested.

To meet this need AAF developed the Electro-Matic filter which combines electric precipitation with a self-cleaning air filter. The Electro-Matic is widely used in industry to protect materials in process and whenever a high degree of air cleanliness must be maintained. If you have a spoilage problem due to atmospheric contamination, write for complete information on the American Air Filter line of air filtration and dust control equipment. Bulletins will be sent without obligation.



AAF AMERICAN AIR FILTER COMPANY, INC., 355 CENTRAL AVE, LOUISVILLE, KY.
INCORPORATED
IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q.

Thousands of tomorrow's buyers are including RUDY Furnaces in their post-war plans!

Rudy will be ready with a *New* line of furnaces that will bring you greater sales

Tomorrow's sales are in the making today!

That's why Rudy's thirty years of specialized home heating experience are important to you now. Important because of the thousands of friends Rudy performance has gained among home-owners everywhere.

As soon as possible, new Rudy furnaces with even finer quality and performance features will be available to help you to greater profits through even greater customers satisfaction.

Meanwhile, rely on Rudy for your replacement sales. Rudy coal furnaces are readily available for essential needs now.

IMMEDIATE DELIVERY!

Immediate delivery on Rudico steel furnaces! Go after profitable replacement sales with this sturdy, low cost, riveted and welded unit. Write department A today for details.

RUDY FURNACE COMPANY • DOWAGIAC, MICH.

EVEN FINER RUDY PRODUCTS FOR THE WORLD OF TOMORROW

★ *Production for them and their brothers in service* ★

The New Long-Life Timer Relay...

THERMO-PILOT

...for Stokers

Positive "Hold Fire" Operation Through Thermal Action . . . No Motor to Service

This new long-life timer relay is ready now to go to work with your stoker ★ Thermo-Pilot has only two simple moving units . . . no gears, no ratchets, no motor noise ★ It is easily installed . . . can be mounted in any position ★ Thermo-Pilot can be used with any stoker control circuit.

The principle of Thermo-Pilot — positive hold-fire operation through thermal action — has been thoroughly pre-tested in thousands of typical installations under the most critical fuel situation in history. The story of Thermo-Pilot is contained in a new booklet prepared by the Perfex Corporation. Mail the coupon on this page for your Free copy today.

Fuel-Saving Starts With CONTROL

Perfex CORPORATION
MILWAUKEE 7, WISCONSIN

PERFEX CORPORATION
420 W. Oklahoma Ave., Milwaukee 7, Wis.

YES. Send me the story of *Thermo-Pilot*, the new long-life stoker timer-relay.

Name.....

.....

Address.....

City..... *State*.....

What about WEIR-MEYER Postwar Plans ?

A SOLDIER looks forward to a brave new world — a world where he and his family and friends can enjoy the comforts and conveniences that Victory will bring.

☆ ☆ ☆ ☆

When that great day comes, WEIR-MEYER will be in the vanguard of the procession offering Heating Equipment of greater efficiency and comfort-giving convenience. Styled for the times, the new WEIR-MEYER Home Heating Systems will be leaders. Leadership is a habit with WEIR-MEYER.

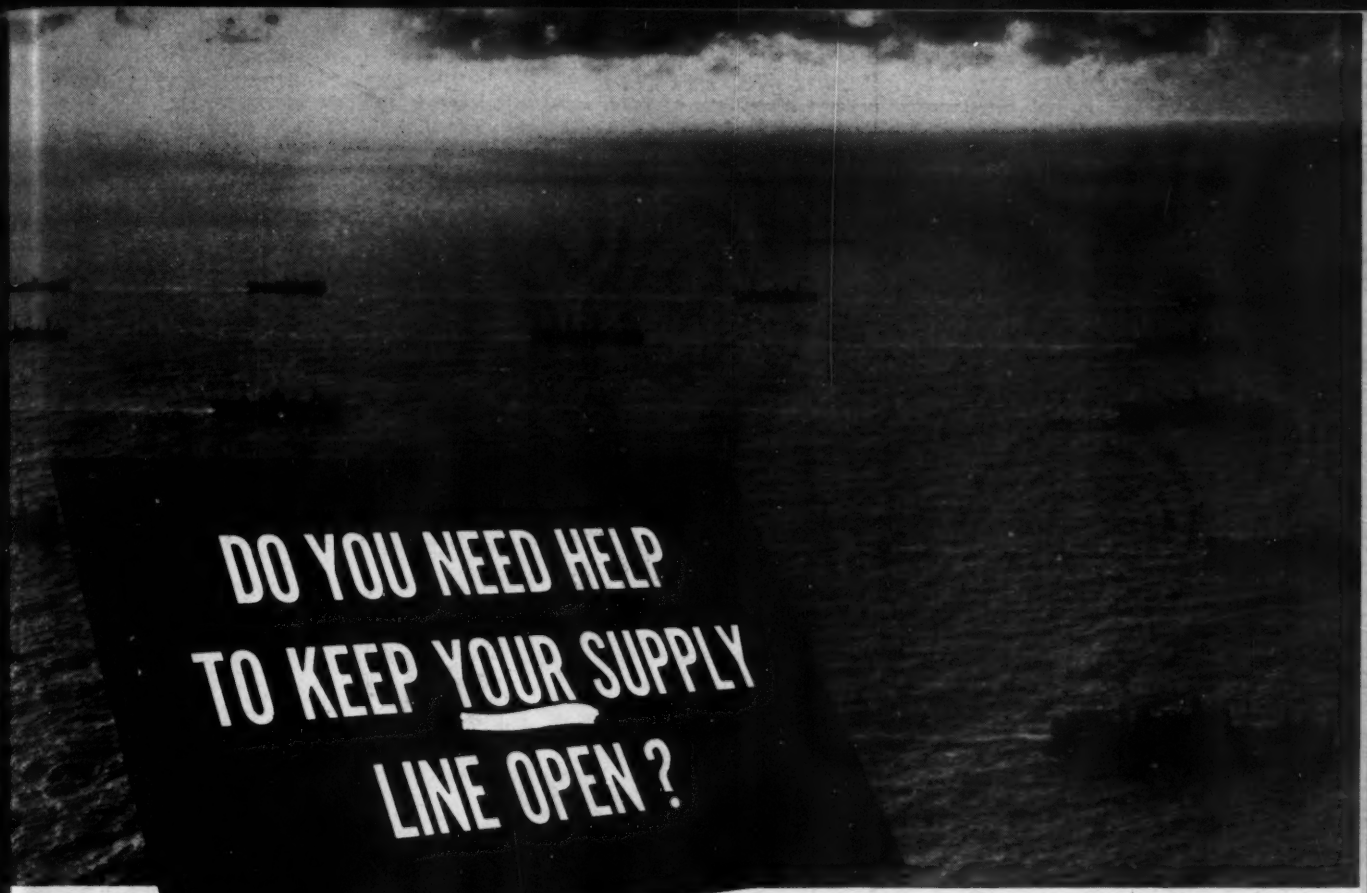
Distributors and dealers who want to serve their communities profitably are getting facts about WEIR-MEYER now. Your inquiry will be welcomed.

☆ ☆ *BUY WAR BONDS TO SPEED VICTORY!* ☆ ☆

WEIR MEYER

THE MEYER FURNACE COMPANY

WEIR and MEYER FURNACES • AIR CONDITIONERS
For COAL • GAS • OIL
PEORIA 2, ILLINOIS • U. S. A.



DO YOU NEED HELP TO KEEP YOUR SUPPLY LINE OPEN?

Need General Purpose Steels?

Many a war job has been speeded up by a call to one of our warehouses. Our stocks, even today, are large. So if you need steel, steel products, machinery and equipment, we'll get it to you quickly if it all possible—subject, of course, to priority requirements. A call to us has saved many a situation. Try us—you'll get prompt, courteous attention. Phone, write or wire our nearest warehouse.

Are you using National Emergency Alloy Steels?

These wartime steels have proved a boon to hundreds of defense plants in meeting conditions imposed by shortages of critical material. In many cases they have performed even better than steels ordinarily used. We have been able to help many of our customers with these steels. If you have any problems connected with their use, we'll gladly assist you in determining the grades best suited to your needs.

Want Aircraft Steels?

Our Chicago Warehouse is designated by the War Production Board as a warehouse to distribute the Aircraft Steels listed below:

WD-X-4130 SHEETS
Open Hearth, Pickled and Oiled to Spec. AN-QQ-S-685. All gauges .016 to .50, sheets 18" x 72".

NE-8630 SHEETS
Open Hearth, Pickled and Oiled to Spec. AN-S-12. All gauges .016 to .50, sheets 18" x 72".

STAINLESS SHEETS
Spec. AN-QQ-S-772.
Spec. AN-QQ-S-757.

STAINLESS STEEL BARS
Spec. AN-QQ-S-771.

These steels are for use in airplanes and available at our Chicago Warehouse only. Phone, write or wire if you are eligible for these steels.

WELDING ELECTRODES—ALL TYPES
These are available through all our warehouses.

UNITED STATES STEEL SUPPLY COMPANY
USS
STEELS
SERVICE

Send for FREE copy of our new Stock List and Reference Book

UNITED STATES STEEL SUPPLY COMPANY

CHICAGO (90),	1319 Wabansia Ave., P. O. Box MM	Teletype CG. 605	BRUnswick 2000
BALTIMORE (3),	Bush & Wicomico Sts., P. O. Box 2036	Teletype BA. 183	GILmore 3100
BOSTON (34),	176 Lincoln St., Allston, P. O. Box 42	Teletype BRTN. 10	STAdium 9400
CLEVELAND (14),	1394 E. 39th St.,	Teletype CV. 153	HEnderson 5750
MILWAUKEE (1),	4027 West Scott St., P. O. Box 2045	Teletype MI. 587	Mitchell 7500
NEWARK (1), N.J.,	Foot of Bessemer St., P. O. Box 479	Teletype NK. 74	Bigelow 3-5920
		REctor 2-6560	· BErgen 3-1614
PITTSBURGH (12),	1281 Reedsdale St., N. S.	Teletype PG. 475	CEdar 7780
ST. LOUIS (3),	21st & Gratiot Sts., P. O. Box 27	Teletype SL. 384	MAin 5235
TWIN CITY,	2545 University Ave., St. Paul (4), Minn.	Teletype STP. 154	NEstor 2821

UNITED STATES STEEL

THE PLANT BEHIND THE SYMBOL
A product is only as good as its maker ... For more than thirty years MORRISON STEEL PRODUCTS have manufactured only the finest ... Post-war will find this plant applying its skill and experience to the new and revolutionary line of MOR-SUN Pressed Steel Furnaces; for all fuels.
MOR-SUN
PRESSED STEEL FURNACES
"The Sun Never Sets with MOR-SUN!"
MORRISON STEEL PRODUCTS, INC., BUFFALO 7, N. Y.

FOR EVERY BEARING REQUIREMENT SPECIFY *Randall* PILLOW BLOCKS

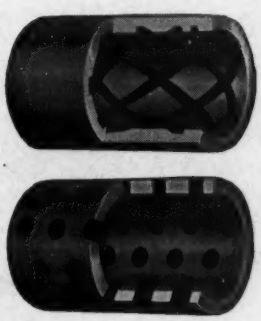
THERE'S good reason why more air-handling units are equipped with Randall Pillow Blocks than any other . . . why the majority of manufacturers use Randalls in their air conditioning equipment. Dependability and efficiency have brought an end to bearing troubles for the equipment manufacturer, contractor and user. Randalls mean freedom from bearing failure and metallic bearing noise in field operation.

Quiet

Be sure to specify Randalls for your equipment. They operate *quietly*. They are self-aligning and self-lubricating. They give extra years of satisfactory service with minimum attention. They are economical and easy to install.

Behind every Randall stands over-a-third of a century's engineering experience in the design and precision construction of "proven" pillow blocks. Catalog No. 42, showing the complete Randall line, gives details and specifications.

Write for it today.



Cut-away sections of two of many types of Randall Graphite Bronze Bearings. Send for complete Graphite Bronze Bearing catalog, No. GB-43.

RANDALL GRAPHITE PRODUCTS CORPORATION

DEPT. 311 **609 W. LAKE ST.** **CHICAGO, ILL.**

Versatile CHERRY RIVETS

BLIND RIVETING
For riveting in a tube Cherry Rivets do a better job
Wide tolerances make Cherry Rivets ideal for any blind spot
Hollow Cherry Rivets make permanent fasteners for name plates
OTHER DIFFICULT RIVETING JOBS
Cherry Rivets will not buckle when fastening rubber
Cherry Rivets reduce spoilage and save time in fastening plastics
Clinching action of hollow Cherry Rivet ideal for clamping sheets

...DO A LOT MORE THAN JUST BLIND RIVETING

The Cherry Rivet is a mechanical blind rivet made of two parts, a standard brazier or countersunk rivet which is drilled and a double headed mandrel which passes through the rivet.

Access to only one side of the work is needed to apply a Cherry Rivet. One operator does the job, using a gun which pulls the mandrel and forms a head on the blind side.

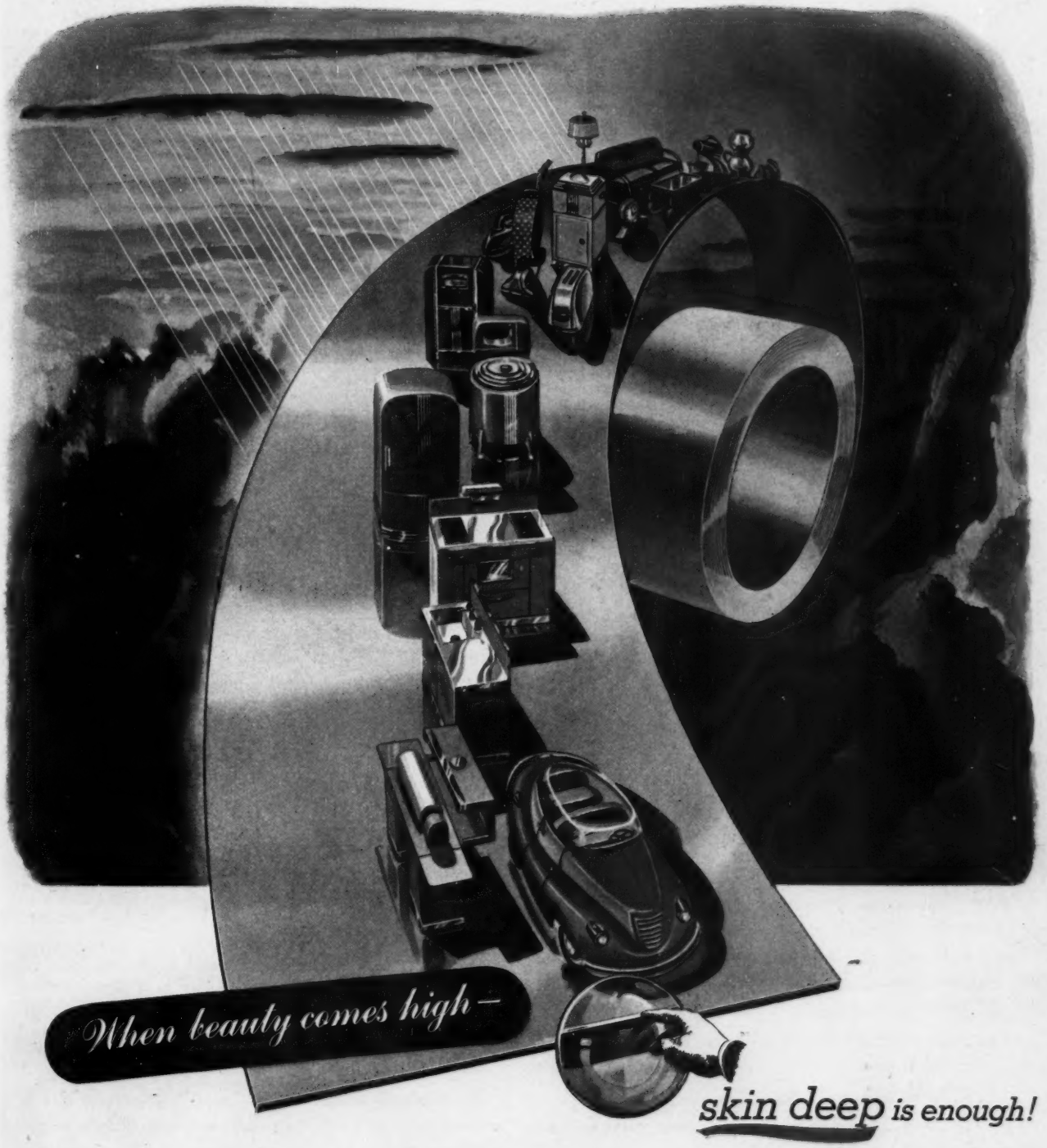
This pulling action eliminates any hammering on rivets or the use of a bucking bar, making the Cherry Rivet ideal for many jobs other than blind spot riveting, such as fastening brittle or pliable materials.

Cherry Rivets are now made of aluminum alloy but new types of rivets in other materials are being developed to meet special needs. If you have any difficult riveting or fastening problems, consult our Engineering Service Department.

WRITE FOR HANDBOOK—Get the complete story on Cherry Rivets in the 16-page Handbook A-43. Address Department A-200, Cherry Rivet Company, 231 Winston St., Los Angeles 13, California.

Cherry Rivets, their manufacture and application are covered by U. S. Patents issued and pending

Cherry Rivet Company
LOS ANGELES, CALIFORNIA

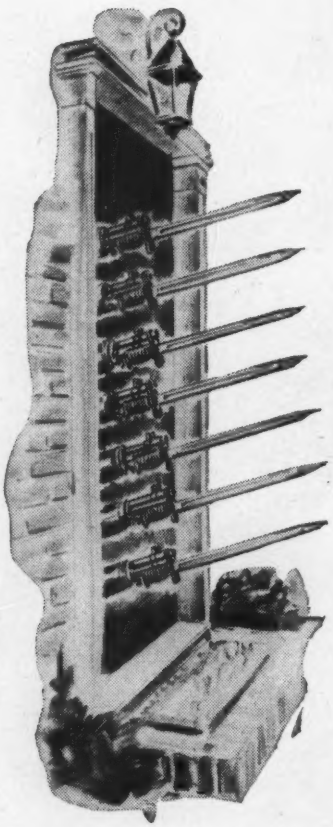


Wherever the *solid* is wasteful . . . wherever the beauty and corrosion-resistance of stainless, the colorful value of copper, the richness of silver, the wearing ability of special alloys are *surface* requirements . . . SuVeneer Clad Metal makes its post-war bid. *Strip steel, inseparably bonded with other metals—one side or both sides, in specified thickness.*

SuVeneer ® Trademark Reg. U. S. Pat. Off. CLAD METAL

Superior Steel CORPORATION

The fight on the doorstep



THIS WAR can't be won on battlefields alone. One of the most critical campaigns of all must be waged right on the doorstep of every family in America.

This is the fight against higher prices and higher wages. It's a fight that *must* be won...or victories on battlefields will be meaningless.

It's like this. In America this year, our total income after taxes will be about 133 billion dollars. But there'll be only about 93 billion dollars' worth of goods to spend it on. If we all start trying to buy as much as we can, prices will shoot up.

As prices rise, people will ask for—and, in many cases, get—higher wages. That will put up the cost of manufacturing, so up will go prices again. Then we'll need another pay raise. If we get it, prices rise again. It's a vicious circle.

The Government has done a lot to help keep prices down. It has put ceilings on food and rent...has rationed scarce articles. But the Government can't do it all alone.

It needs *your help!*

Your part in this fight won't be easy. It will mean foregoing luxuries, perhaps doing without a few necessities. Tough? Maybe... but don't say that where the veterans of Italy and New Britain can hear you!

You *want* to do your part, of course. So do we all... farmers, laborers, white-collar workers, business executives. And the way to do your part *right* now is to observe the following seven rules for Victory and a prosperous peace...

1. Buy only what you NEED. And before you buy anything, remember that patriotic little jingle: "Use it up. Wear it out. Make it do or do without."

2. Keep your OWN prices DOWN! If you sell goods, or your own time and labor, *don't ask for more money* than you absolutely must! No matter who tries to talk you into asking more... *don't listen!*

3. No matter how badly you need something... *never pay more than the posted ceiling price!* Don't buy rationed goods without giving up the required coupons. If you do, you're helping the Black Market gang—hurting yourself!

4. Pay your taxes cheerfully! Taxes are the cheapest way to pay for a war! The MORE taxes you pay now—when you have some extra money—the LESS taxes you'll pay later on!

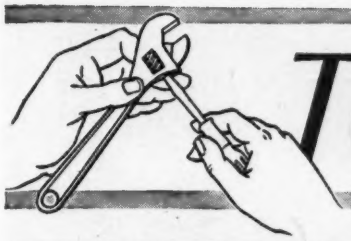
5. Pay off old debts. Don't make any new ones! Get, *and stay,* square with the world!

6. Start a savings account. Make regular deposits, often! Buy life insurance. Keep your premiums paid up.

7. Buy War Bonds... regularly and often! *And hold on to them!* Don't just buy them with spare cash you can easily do without. Invest every dime and dollar you don't actually NEED... even if it *hurts* to give those dimes and dollars up!

Use it up...Wear it out.
Make it do...Or do without.

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by the Magazine Publishers of America.

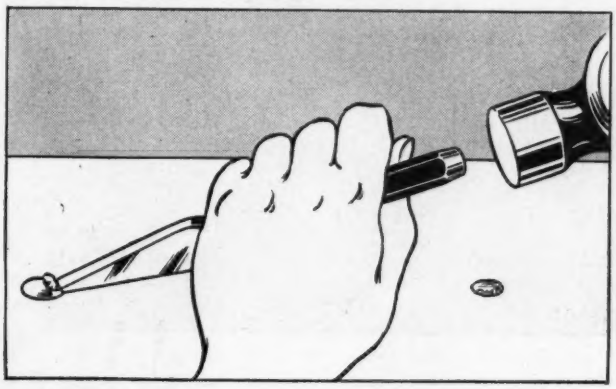


TOOL NOTES

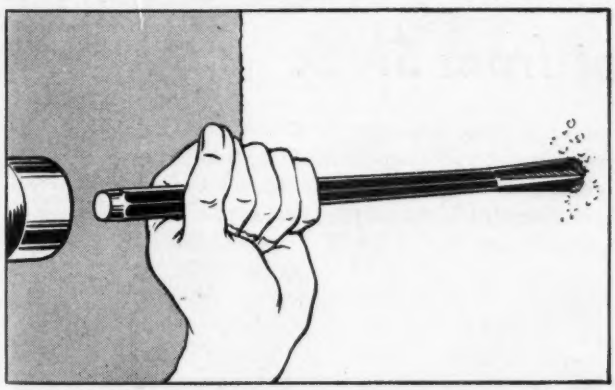
"How To Do It" Information For Crescent Tool Users

No. 19 . . . . PICKING THE PROPER TOOL FOR THE JOB

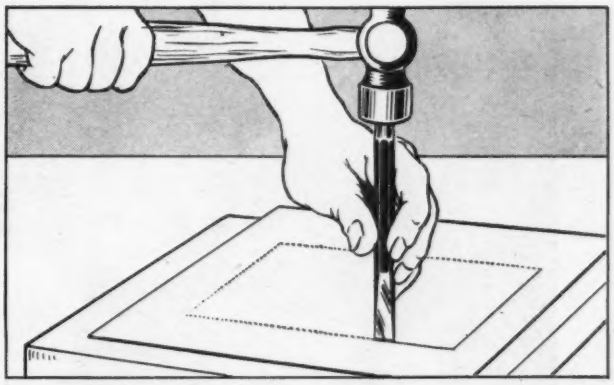
A few simple rules will help in selecting the proper cold chisel or punch. In making your selection, remember this basic rule: cold chisels are designed to cut only metals softer than the tool itself. Use a heavy hammer: a light hammer won't transmit the force of the blow to the cutting edge.



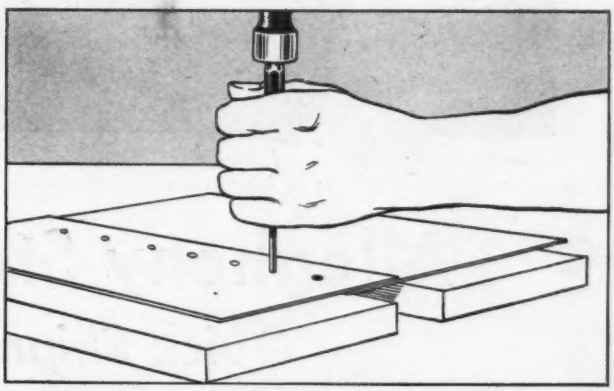
Probably the easiest way to remove a rivet head is to use a Crescent Cape Chisel, as illustrated. Cut through center section first, then knock off the two side wings.



A Crescent Star Drill is the proper tool for making holes in concrete or other masonry. Give the drill a quarter turn after each blow with a heavy hammer. In a pinch, a cold chisel will suffice but work is slower.



Use a Crescent Cold Chisel to cut sheet metal with a back plate. First scribe the line or design and with sheet laid on back plate, cut as illustrated. Finish edges with a file.



Use a Crescent Pin Punch to drive out a rivet or pin. Select a punch having a diameter slightly less than that of the rivet. A point too small may upset the end of a soft rivet and make it seize.

MAIL THE COUPON FOR FREE REPRINTS

This is No. 19 in Crescent's TOOL NOTES Series. These informative advertisements provide practical information for users of hand tools. Mail the coupon today!

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

CRESCENT TOOLS
Give Wings to Work

Crescent Tool Co., Jamestown, N. Y. J-1

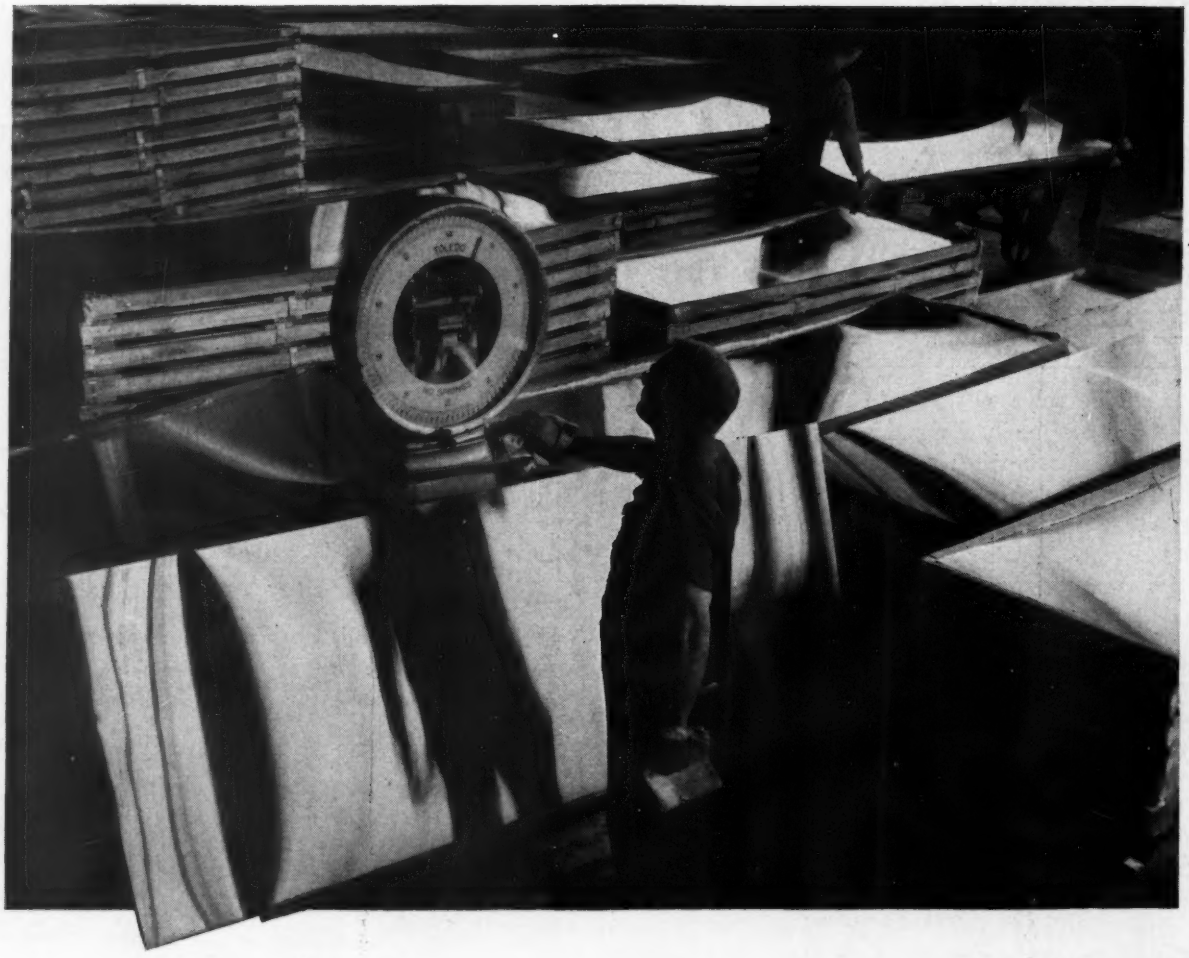
Please send your "TOOL NOTES" Series

☐ for Bulletins ☐ for 3-ring binder

Name _____

Address _____

City _____ *State* _____



Allegheny Stainless Sheets—

Quick Shipment from Stock

Make Ryerson your quick dependable stock source for Allegheny Stainless sheets . . . and for all other stainless products including: bars, plates, tubing, pipe, welding rod, nuts, bolts, etc. Available stocks include not only the familiar 18-8, but many other types of stainless steel.

Whether your application involves heat or corrosion resistance . . . whether you need one type of finish or another . . . whether you need help in applying or fabricating . . . Ryerson engineers and metallurgists will gladly work with you in meeting your requirements.

Our special precautions in the handling and storing of stainless; our modern cutting equipment and unequalled dispatching facilities assure you of quick delivery. Call your nearest Ryerson plant when you need steel. Your copy of the Ryerson Stock List —complete catalog of steels in stock for immediate shipment including: bars, shapes, plates, sheets, structurals, tubing, carbon and alloy steel, tool steel, Allegheny Stainless and many others will be sent to you on request.

JOSEPH T. RYERSON & SON, Inc., Steel-Service plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Pittsburgh, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE

Suggestions For Your Manpower Problem

TWO months ago, in the January issue, we published a summary of the "Manpower" problem confronting our industry in 1944. That January summary was, we believe, a pretty accurate job of reporting the "basic" situation and the steps best suited to solve the problem.

But, in actuality, those January issue suggestions are pretty sterile because, in the final analysis, the group which will decide *your* manpower problem is *your* local draft board. To be actually useful, any summary of manpower expectations would have to be a summary of the attitude and problems of *every* draft board in the country.

This much basic data can be used as a guide to your manpower manipulations in 1944:

1—The armed forces want more men than we can supply from most local draft board pools unless the boards take fathers, reclassify unfit and call all deferred men.

2—There is a growing shortage of manpower in essential war industries in many of the most important war production areas. To satisfy these requirements, manpower must be moved—voluntarily or by law—from areas where there are manpower surpluses.

3—Average production per man employed is below possibilities because of absenteeism, carelessness, labor hoarding, strikes, slow-downs, etc. To offset this more men must be used.

4—Manpower dispersion is a mess—there are men needed in some areas; men are out of work elsewhere. There are too many men doing non-essential civilain work; they cannot do war work because of lack of training, too low wages, family responsibilities and they cannot throw up everything and go into the war plant.

So far as our industry is concerned, the situation seems to boil down to about this:

1—Make use of every legal step provided (manning tables, replacement schedules, deferment appeals, etc.) to get the men you need anchored in your shop—up to the limits of your patriotism.

2—But don't depend on these legal measures to insure your labor force—if you do you may find that an emergency need in your local draft board will throw your careful plans into the ash can.

3—Make utmost effort to build your working force on a crew which can't be touched by the draft. This means men over 38; men whose physical handicaps absolutely discharges them from war service; use of women whenever possible; place yourself on record with USES for any discharged veteran.

4—On this seemingly stable base, rearrange your plans for business volume and activity to fit the manpower you have—this may mean discarding some activities you would like to follow, but can't; it may mean doing work you don't like to do, but which lends itself to your manpower.

5—Look around your shop and determine if another machine or some new tools may make it possible for you to do work you can't do without them or use labor you can't use profitably with your present setup. Government, in the next few months, is, we think, going to try to make it easy for a man to improve his production facilities.

6—Keep your eyes open for any service or product which is available and which can be sold with the manpower you have. You may not like to handle this product; you may not find the profit possibilities up to your usual requirements; it may be foreign to your first loves—but the problem in 1944 is to keep the shop open; to keep cash money in the bank; to keep going without wrecking your own health because of worry and overwork.

In conclusion, we suggest a careful reading of Arnold Kruckman's Washington Letter in this issue. This much seems indicated in his report—on most of the materials used by our industry there is or shortly will be surpluses sufficient to keep our industry operating normally; we supply an essential service, so we will be favored just as quickly as possible; we will not

(*Continued on page* 108)

Now and Post-war You Should Have

A *Monthly* Budget For Sales and Costs

By Arthur Roberts

THE year 1944 can be a crucial one for warm-air heating dealers and sheet metal contractors. Those who avoid the red in 1944 and show some profit will be in a preferred position to capitalize on the big post-war market for warm-air heating and air conditioning certain to materialize then. Will *you* keep out of the red in 1944? You can minimize the hazard by planning your work and working your plan—not a mental resolution to do this or that, but an actual compilation of estimated figures covering sales, cost of sales, margin, expense and profit. In other words, a budget appraising profit possibilities on replacements and repairs, your main sources of revenue in 1944.

Members of this industry frequently asked: "Is budgeting necessary today?", assuming that these hectic times make the efficacy of budgeting questionable. To all querists, we reply that because manpower and materials shortages distort normal operating ratios, budgeting is more important today than ever before, but it must be handled in a different manner to be a dependable guide. In this article, we will discuss the means by which the budget can be handled most effectively in our wartime economy and during the postwar period until manpower and materials flow freely again.

Working Estimates Monthly

Before the war, budgets were prepared in advance for annual or semi-annual periods, but today, with changes coming so rapidly, and in the postwar period, when our prewar economy may be distorted even more, budgets should not consider forthcoming operations for more than one month in advance. There is no harm, of course, planning operations for the entire year so that you get an idea of the yearly volume you may expect, breaking down your figures into the cost of sales, margin, overhead and net profit, in fact, this should be helpful because it provides a longer range objective to work to, but, at the beginning of each month, compute your working estimates for that month.

Before Pearl Harbor, the dealer or contractor using a budget, geared all operating elements—labor, materials, purchase of equipment, margin, overhead, direct job expense and net profit—to the sales figure. Today, with money and jobs plentiful, manpower and merchandise scarce, he can readily sell his wares, so selling is no longer a safe base upon which to estimate. It isn't how much business you can get, but how much equipment you can get to do your jobs that should guide you in estimating potential sales and profits.

In prewar days, sales were geared high, sometimes higher than the dealer or contractor hoped to attain, a figure set more as a goal, a mark to shoot at, on the assumption that if he set up a substantial sales quota and tried to make it, he would more than likely fare better than if he ambled along month to month hoping to get somewhere. The same reasoning *should not be followed* when setting up budgetary figures today. Be conservative. Figure low.

1944 Budget Factors

Your monthly budget during 1944 should be set up after considering the following factors:

1—Your sales for the corresponding month in 1943.
2—Your cost of labor, materials and equipment for the preceding month, in percentage of sales.
3—The labor hours salable during the coming month.
4—Your inventory at the end of the preceding month.
5—The prospect of getting additional supplies from suppliers during the coming month.
6—New regulations passed by the government that will "up" or "down" inventory, volume or profit.
7—Your overhead and margin percentages for the past 3 months.
8—The estimated monthly tax to be paid on income.

Heretofore, it was considered good practice to take the average sales for the past 3 to 5 years and use this as the starting point for computing the current quota, increasing or decreasing it according to conditions, but today, with merchandise and manpower restricted, this method is no longer wise. Make comparisons month-to-month with the previous year ONLY (and this practice should be followed in the postwar period, too) because your experience figures of years gone by are no longer dependable.

Sales Now Depend on Production

Under present conditions, if you are budgeting for March 1944, consider March 1943 sales as the top-flight figure in setting the current monthly quota. But, have you manpower, materials and equipment to make that quota? Your cost of labor, materials and equipment for the preceding month is your yardstick. Suppose sales were $3,000 in February, 1944, labor and materials, $1,800, that is 60 per cent based upon sales and it is reasonable to assume that the same ratio will hold in March, 1944. So, if sales in March, 1943, were $5,000 and you set this as the quota for March, 1944, you must have sufficient manpower, materials and equipment on hand to cover $3,000 or 60 per cent of $5,000. In other words, gear sales to manpower and materials because you can't sell what you haven't got and you can't expect to get all the re-sale items you want in 1944.

If labor was 25 per cent of sales in February, 1944, use this figure as the ratio in March, 1944, so 25 per cent of $5,000 is $1,250. Have you manpower enough to cover this cost? Compute this by multiplying the

wage rate by the working hours of manpower available for March jobs. If labor and materials cannot produce $5,000 sales in March, cut the quota proportionately. If materials cost was 35 per cent in February, 1944, use this ratio in March, 1944, so 35 per cent of $5,000 is $1,750. Have you enough stock on hand to meet this cost with ample carry-over to April? If not, cut budgeted sales for March proportionately.

The monthly inventory now is a "must" to determine if stock is ample for the sales quota. If inventory is small, a physical count may be taken monthly, if large, this entails too much work so go back to the last time you took inventory, say it was December 31, 1943, and use this formula.

Inventory December 31, 1943	$2,000
Materials purchased in January	1,600
Stock total	$3,600
Materials used in January at cost	1,100
Stock on hand January 31, 1944, at cost	$2,500
Materials purchased in February, 1944	1,200
Stock total	$3,700
Materials used in February, 1944, at cost	1,500
Stock on hand February 28, 1944, at cost	$2,200

In this case, stock on hand shows a carry-over of $450, the difference between $1,750 as estimated and $2,200 stock on hand, enough to keep going for at least a week in April and we'll assume that the additions to stock in March and April will provide ample stock to carry through with a carry-over to May. This is basically the revision you must follow in setting budgetary quotas. The shops of sheet metal contractors and the showrooms of warm-air heating dealers differ widely in the type work done, requirements and operating methods, hence, you must make your own appraisals and analyses. We offer here the fundamentals of budgetary revision. It is up to you to fix reasonable estimates from computations in line with requirements, experience and expectations.

Overhead and Profit Estimates

Follow the foregoing method of inventory computation throughout the year, adjusting the figures to agree with a physical count when taken. Even if you do not budget, it is wise to start computing inventory this way in order to note the trend and have a reasonably accurate estimate to use on the monthly profit and loss statement, which is another important tool of trade today. The Alpha and Omega of record-keeping are the budget and profit and loss statement, both prepared monthly. Without their guidance today and in the postwar period, you may be pretty far a-sea and not know it. Budgetary figures should be checked monthly against actual performance on the profit and loss statement and discrepancies checked carefully.

Once the sales figure, based on materials, equipment and labor, is estimated, you can arrive at budgetary figures for margin, overhead and net profit by using the overhead ratio to sales experienced the previous month, but first make sure you pro-rate all expenses monthly. For example, if overhead was 30 per cent of sales in February and your quota for March has been set at $5,000 sales, then estimate overhead for March at $1,500 or 30 per cent of $5,000. If labor, equipment and materials cost 60 per cent of sales in February, then, obviously, the margin is 40 per cent, or $2,000. Deduct $1,500 overheard from $2,000 margin and you get $500 estimated net profit, or 10 per cent on sales. Now, deduct for income tax, a factor that too few consider on their budgets, but they must do so from now on, because taxes are so high. Estimate your tax monthly and deduct from the estimated net profit to get the real McCoy on your pocket-profit. You can't spend your taxes—only what's left after taxes are deducted.

Price Control Limits Profits

Price control and other wartime regulations must be considered when preparing the 1944 budget. You can't budget for more margin so readily because price control may restrict it. That is another reason why budgets and profit and loss statement should be prepared and analyzed against experience figures for 1943, the first full year of price control. Although the previous month's figures are the most dependable yardsticks to use on cost of sales, margin and overhead, it is also wise to review their 1943 ratios because they may offer helpful suggestions.

In the postwar period, when manpower and merchandise loosen up again, many new products will be offered warm-air and sheet metal customers. Then you can switch back to the old method of gearing the budget to sales volume and budgeting will be just as essential to maximum earnings then as now. Retain the practice of month-to-month estimating until business becomes stabilized and this may be some time after the war. You can start budgeting any time during the year, the sooner the better, which was not so easily accomplished when estimates were prepared for a year in advance.

Dealers and contractors operate in a black-out today. What they may bump up against tomorrow is no longer as discernible as in prewar days. So, obviously, their vision dimmed by abnormalities and in the dark, they need a white safety line to keep them on the right road. That guide is a budget, setting up normal quotas for all operating elements and then seeing to it that actual results approximate quotas—or why they don't, so that correctives can be applied immediately.

It's the old story of planning your work and working your plan that always paid dividends, only today and in the postwar world of tomorrow, you must adjust the process to suit the new order.

Can't Re-rate for L-79

MANUFACTURERS of plumbing, heating and cooking equipment may not apply the AA-3 rating, recently assigned to sellers of such equipment, to lower rated orders which they had already received when the new rating went into effect, unless permission is granted by the War Production Board.

The *person who placed* the order must apply in writing to WPB's Wholesale and Retail Trade Division and if approval is obtained should then notify the manufacturer that he may apply the higher rating, it was explained.

Interpretations, Amendments, Easements To Existing Orders

CMP-4 vs. CMP-9A

IT HAS been pointed out to me that your article on CMP Regulation 4 and CMP Regulation 9A which appeared on Page 104 of your January edition may convey a misapprehension to some of your readers. May I outline briefly the restrictions of the two regulations:

CMP Regulation 4 controls the operation of steel, copper and aluminum warehouses. Deliveries of steel from these warehouses may be made generally in two ways. One is on an authorized controlled material order, for which authority to place is furnished by other CMP regulations. The other is under the provisions of paragraph (d) (4) (ii). That paragraph permits a warehouseman to deliver a certain named quantity of steel without an authorized controlled material order or preference rating or any other authority of the War Production Board. However, that paragraph is intended to take care of persons who use small quantities of steel. Consequently, if a person purchases any steel under the provisions of that paragraph, they are restricted in their total purchases during the quarter to the amounts specified.

A repairman may obtain the right to place an authorized controlled material order either by filing Form CMP-4B, in which case an allotment and a preference rating will be given him, or by operating under CMP Regulation 9A. CMP-9A regulation automatically gives him the right to place authorized controlled material orders for up to 20 tons of steel in any one quarter. The preference rating assigned by the regulation is ineffective in determining deliveries of controlled materials (steel, copper or aluminum in the forms listed in Schedule I of CMP Regulation 1).

Now, although a repairman may buy steel under paragraph (d) (4) (ii) and also under CMP Regulation 9A, if he does so he may not buy more than the amounts listed in paragraph (d) (4) (ii) of CMP Regulation 4. Thus in the case of sheet, he would only be permitted to purchase 10 tons of sheet during any calendar quarter; whereas if all of his purchases are made under CMP Regulation 9A, he will be permitted to purchase up to 20 tons of steel sheet.

Very truly yours,

I. N. P. STOKES, II
Ass't General Counsel, WPB.

◆

CMP-9A—Direction 2

REPAIRMEN may use only up to $25 worth of material purchased under procedures contained in Controlled Materials Plan Regulation No. 9A for installing any unit of cooking, plumbing, heating or used air-conditioning or refrigeration equipment, the Controlled Materials Plan Division of the War Production Board announced Feb. 26.

However, if a new air-conditioning or refrigeration system has been authorized under the provisions of Limitation Order L-38 and authorization to construct has been granted under the terms of construction Order L-41, a repairman may use up to $250 worth of material purchased under CMP Regulation No. 9A to install the new system.

These general rules, which are contained in Direction No. 2 to CMP Regulation No. 9A, do not increase the over-all amounts of materials that repairmen are permitted to purchase under the CMP Regulation No. 9A procedure.

Previously repairmen who desired to make these types of installations were required to file specific applications with WPB for the materials needed to make each such installation. Under the modified procedure, this is no longer necessary, unless the repairman needs more materials than the specified limits permit to make the specified installation.

◆

WMC Appeals

UNRESTRICTED right of appeal from decisions of the War Manpower Commission is now provided in a revision of its regulation governing appeals. The original WMC regulation issued May 22, 1943 specifically indicated those persons entitled to appeal and spelled out under what conditions appeals could be made.

The new regulation, furthermore, extends the right of appeal both to worker and employer affected by a decision made at any step of the appeal process. Both persons involved must be present at the hearing before the area appeal committee or explain absence, but otherwise there are no restrictions on the right to take the case higher.

The revised regulation holds that a statement of availability, once issued, stands. The employer may appeal as a matter of principle or precedent but he cannot demand that the statement of availability be withdrawn or that the worker be required to leave his new employment. In order to provide a means of reviewing the action of local employment offices before the services of a worker are lost to an employer, the revised regulation provides an optional procedure for temporary suspension of the issuance of statement of availability and making referrals in certain types of cases. The suspension may be for a limited period only, the maximum period allowable being 10 days. This procedure is designed to give employers the greatest degree of relief consistent with protection of the rights of workers.

◆

Compensation of Commission Salesman

THE Director of Economic Stabilization has announced a uniform policy for treatment of commission employes under the stabilization program during 1944. The announcement was made in a letter to the Commissioner of Internal Revenue authorizing and directing him to apply the same stabilization rule to

commission earnings and certain related methods of compensation as is now applied by the National War Labor Board.

Under the National War Labor Board's rule, applicable to commission salesmen earning less than $5,000 per annum, no approval for any increase or decrease in total annual commission earnings is required so long as the commission rate on the individual transaction is not increased or decreased. Any change in commission rate and any change from salary to commission basis requires the approval of the Commissioner of Internal Revenue or the National War Labor Board, depending on which agency has jurisdiction.

The restrictions under the stabilization program on changes of basis hourly piecework or salary rates are equally applicable to changes in commission rates.

This action does not involve any change in the policy on the salesmen's own sales. Although regulations were issued by the commissioner on Sept. 4, 1943, designed in general to limit total commission earnings to those of the previous year, this regulation was subsequently suspended as to commissions on the salesmen's own sales.

The action approved by the Economic Stabilization Director unifies the principles to be administered in 1944 not only for direct commissions, but as well for compensation based on a percentage of the sales of others, a percentage of profits and other like arrangements. With respect to these latter employment contracts, the director's action taken pursuant to the commissioner's recommendation modifies the restriction on increases in total earnings administered by the Commissioner of Internal Revenue during 1943.

◆

Amended CMP-1

RULES governing the use of controlled materials after they are received by a manufacturer were clarified Feb. 5 in an amendment to CMP Regulation No. 1, which deals with basic CMP allotment procedure.

The amended Regulation permits a manufacturer to use surplus material to fill another authorized production schedule than the one for which the material was originally acquired, if he changes the original allotment account.

Formerly, a manufacturer could only use such material to fill another authorized production schedule if the other schedule was identified by the same claimant agency letter symbol.

The amended Regulation states that a consumer of controlled materials may keep such materials and Class A products received in a common inventory. In withdrawing from this inventory, he does not have to charge these products or materials against his allotment account.

Manufacturers operating under several production schedules do not have to maintain separate records for each schedule, if their usual records indicate that the production on each schedule is substantially in proportion to the amount of the allotments received for each schedule, and that their aggregate production of any product does not exceed the aggregate of the production schedules authorized.

Consumers of controlled materials must charge their allotment accounts with materials acquired under Priorities Regulation No. 13, unless that Regulation indicates that such a charge is unnecessary. In certain instances, WPB Regional Offices are permitted to allow the allotment purchase of controlled materials, under provisions of priorities Regulation No. 13.

The modified CMP Regulation No. 1 requires that consumers check on their allotments the first of each month, and if they find that they have been allotted more controlled materials than they need, returns of the excess must be made by the tenth of the same month.

At the end of each calendar quarter, a consumer of controlled materials must determine whether he has used his entire allotment by placing authorized controlled material orders or making allotments to secondary consumers, and, if he has any excess, regardless of how small it is, he must return it by the tenth day after the close of the quarter.

Minor changes are made in the symbols designating Claimant Agencies.

In addition, the list designating controlled materials has been spelled out in greater detail, indicating more specifically what materials are in the different categories.

◆

Form WPB-547

DISTRIBUTORS wishing to buy rated goods directly from manufacturers have, since February 1, been able to make Application for Preference Rating on the simplified Form WPB-547. WPB-547 has been partially re-designed to eliminate all possible paper work, to provide WPB with more comprehensive information, to shorten the interval between application and rating assignment.

Principal WPB-547 change permits the applicant optional use of quantities of goods, rather than dollars, for all but one entry. Thus three mathematical computations may be eliminated, as many distributors have requested. However, careful examination of the problem showed that, unless dollars were retained for the final computation, more work and some injustice would result.

The new form WPB-547, to be identified by its date 2-1-44, has been in use since February 1, 1944, and may be obtained from the War Production Board. Regional and District offices will be supplied with adequate quantities, or users may write to WPB's Wholesale and Retail Division in Washington. So that any remaining current forms will not be wasted, they may be used for sixty days following the effective date of the new form, or until April 1. On and after April 1, all preference rating applications *must* be on the revised version of WPB-547.

◆

Inventories of Power Tools

BECAUSE Western dealers in light power-driven tools are a greater distance from sources of supply, inventory provisions of the order governing these tools were amended by the War Production Board to relieve these dealers of possible hardship.

The action was taken through amendment to Limitation Order L-237.

The order previously provided that no supplier could accept delivery of any light power-driven tool which would increase his inventory of that size and type of

(*Continued on page* 110)

Arnold Kruckman's

Washington Letter

Why You Don't Get Materials

THE reason there is so much confusion about the materials you need, and, generally, you can't get, is not easy to explain. The explanation is difficult because if it were given in its most simple essentials it might be misundertsood. You might infer meanings the reporter would not wish to accept responsibility for. Probably the clearest way to tell the story is to give you what they tell here, and let you form your own conclusions. Obviously the whole thing goes back to the actual fighting fronts. Recently, Constantine Brown, regarded here as having the confidence of the highest officers of the Army, wrote this in the conservative Washington Star:

"The political hens which have hatched strategic chicks have come home to roost. The Italian front is bogged down and for the time being we are on the defensive along the whole front. . . . The unfortunate element in the picture is that the Italian stalemate has occurred just before the invasion of western Europe. This operation must be on a tremendous scale in which the bulk of our land, sea and air forces are engaged.

"Originally only a minor group of armies had been earmarked for diversional attacks on other sectors of the huge front extending probably from Norway to the eastern Mediterranean. French, Polish, and imperial divisions under the command of British and American generals were slated to keep Nazi divisions from being rushed from southern Europe to the principal invasion front.

"The fact that we are stymied in Italy may change the picture. Should the Nazis bring further reinforcements to the southern Italian front it is possible that we may have to strengthen our tired troops with divisions intended for other more important operations.

"The campaign in Italy had a political rather than strategic background. . . . When it was first suggested, after the conquest of Sicily, most American strategists were opposed to it. . . . America's principal military thinkers believed Italy would be a bottomless sack into which we would have to pour a large force. According to the best available information, this point was emphasized before the two principal Allied strategy framers, President Roosevelt and Prime Minister Churchill. . . . Despite all this, which was an effect on the Allies' other strategic plans, the invasion of Italy was decided on. . . . The pessimistic forecasts unfortunately proved correct. . . . But it is evident that in order to reach the objective which politically minded strategists set out to gain—Rome—we will have to make another real effort.

"We must now bring the campaign to a successful conclusion regardless of cost. But the question in the minds of those who are looking for an early cross-channel invasion is whether we can do the Italian job without weakening our offensive power for the main military objective—Western Europe."

Invasion Is Key

At this writing, early in March, invasion influences every major thought in Washington. Gen. Marshall and his associates already have frankly told us the fortunes of war may make it necessary for us to resume production of supplies which plants already are prepared to manufacture, and that we may be called upon to make things we have not hitherto made. War-making is like all other human experiences. You plan to pour most of your effort in one direction, and when you come to the doing of your planned program you find unexpected exigencies make necessary that some obscure part of the program must take the place of the part you calculated as the most important.

The smart wise-crack here now often is a reference to invasion jitters. The assault on western Europe is undoubtedly the most stupendous military action in the world's history. It should not be difficult to appreciate the tension of those who are responsible for its success. It is logical they should feel that every phase of civilian life must be subordinate to the job they have been given to do. This naturally leads them to feel that the manufacturer, the worker, the distributor, the man and woman, who are carrying on in the ordinary civilian channels of our life, can well afford to wait until the whole picture is clearer. The attack on western Europe obviously is one of the most critical events in the history of the world. The men we have loaded with the responsibility for doing the task inevitably feel we should hold everything in readiness, to throw everything we have and everything we can do into the battle, when it is necessary, and how it may be necessary. This climax, in their opinion, will be decided back home as much as it is decided on the battlefront.

The officials in the civilian war agencies understand the military viewpoint more clearly than the people at large. The officials at the top understand why the

military feel it is necessary materials be withheld, manpower be kept in suspension, and facilities in a state that they may be readily thrown into essential operation. The military have sold their idea to the smaller segment of official Washington that is able to control policies. The military naturally are able to dominate the essential actions of the civilian war agencies. Army officers are members of practically all committees which control the flow of materials, services, and facilities. They do not suggest denial of the requests you make; they simply say *wait*. They ask that right-of-way be given to landing barges. We have just heard about a new program for the construction of pontoon barges which will require 180,000 tons steel, chiefly 10-gauge and 3/16 inch plates, sheets, and a large tonnage of floor plates. The informed word is that you may just as well make up your mind that this condition will continue until the end of June.

The Manpower Tangle

This is an election year. Politically it is not profitable news that supplies may be still tighter, that transportation may be more difficult, that workers may be even more difficult to obtain despite the fact that thousands of people are said to be jobless. The grapevine tells us that large numbers are out of work in Iowa, in Montana, and other mining areas, and in California. Cutbacks and cancellations are reported to be growing more numerous. And at the same time there are areas desperately short of manpower.

Apparently the draft boards must find between 500,000 and 1,000,000 men more than the program for induction requires by June 30. The draft boards must fill the void created by the 100,000 men discharged from Army every month for various reasons, and by the deferments during the past months which seriously pinched the monthly additions to the Army. The Army has steadfastly held that civilian industry has never done its share in contributing proportionately to the armed services and to the war industries.

There is much serious talk here in responsible quarters that manpower must be moved *by mandate* from the places where plants have closed, and where there is a surplus of workers. They do not say how it is to be done. Congress still is sharply opposed to the national work service law. Here, in the immediate neighborhood of Congress, WMC has started the machinery to move 300,000 men and women out of the capital area into Virginia, Maryland, West Virginia, and North Carolina, where war workers are desperately needed. Maryland must produce war products to cost $4,500,000,000; Virginia, $2,000,000,000; North Carolina, $1,250,000,000; and West Virginia, $700,000,000. This migration is to be a voluntary movement. The workers, half of them women, are to be "persuaded" through USES, and other WMC agencies, to leave their homes, and to leave non essential jobs, and go to the war jobs. The shift as an organized operation will be greatest migration attempted during this war. During the past war years, 36 states have lost 5,000,000 population, and 12 states have gained 2,000,000. California had the greatest net gain, approximately 700,000, almost four times as much as any other state. Every state of the West Coast has had net gains. Over half the shift of population moved towards the west slope.

Materials Granted But Not Delivered

These concomitants of the war picture are not pleasant in a major political year. It is easy to understand why the politician tries to ignore these aspects, and why he tries to soften the impact of the knowledge that you will probably not receive much more sheet metal, and other supplies. You have learned that OCR has been allotted 210,000 tons of steel for the second quarter, as against 155,000 tons for the first quarter of this year. This pleasant news seemed to indicate there would be more metal for furnaces, for heating controls, for sheet metal, and for all other uses to operate your civilian industry. But a few days later it was announced the increased allotment might be used to produce those items for which there had been allotments in the past, but which had never been completed.

Most manufacturers have now learned that an allotment is not a guarantee of actual physical possession. And then it was announced that the original WPB policy of rigidly restricting production of civilian goods to absolutely inevitable basic essentials would not be affected by any announced allotments, pending the clarification of military trends and requirements in Europe. The essence of the situation is made clear by the electric iron example. The original announcement promised 2,000,000 electric irons for the civilian. The electric iron was one of the items demanded by the housewife when the OCR surveyors canvassed the country. Apparently the housewife was in a fair way of getting electric irons, electric refrigerators, and electric washing machines. But when the later releases were published, it was clear the program would be scaled down, and that if materials allocated were made available a substantial quantity of the production would have to go to supply war needs. In other words, the housewife was politely gypped out of some of the supplies she expected the manufacturer to provide.

Don't blame your friends in OCR or WPB. Don't blame any person. C'est la guerre. Don't even waste time blaming the men—and women—with whom you do business in the Government, for their optimistic evasiveness. They are on the spot. They sincerely want to believe the vague optimism with which their superiors inspire them; and their superiors sincerely hope—against hope—that their hopes may come true. And don't let any one lead you to think unkind things about the men in the Army. They are fighting a war, and they need every break they can get to finish this war as swiftly as possible. It is possible they may be a little exorbitant in their pressure on you. But they think they are right, and they are convinced they need what they are asking. Make up your mind to accept as manna any unexpected bit of material or advantage that comes your way, and to do without it if you don't get it. And don't feel distressed if you learn of some person or some group or some industry that has been given a break that has not come to you. A democracy is a strange and beautiful institution. The contradictions, like the waste, is the price we pay for being members of a democratic society and economy. Autocratic systems are efficient, but they are hell to live with, according to the authentic recitals of those who know.

Appeals Help Some

There are certain things that are in the category of permitted production. Often the classification is wide and susceptible of generous interpretation. Some producers appear to have the genius to convince WPB and OCR that the elasticity of the documentation is sufficient to include what they want. You also will find that WPB is quite amazed that business men are not more alert to the appeal clauses in the Orders and Directives. Appeals based on genuine needs have been

(*Continued on page* 116)

History of the NATIONAL WARM AIR HEATING and AIR CONDITIONING ASSOCIATION

By . . . ALLEN W. WILLIAMS

CHAPTER 12

Industry Grows to New Stature

W. L. Rybolt elected president; Robinson-Patman Act becomes law; the New York meeting; "Winter Air Conditioning" published.

IT WAS in January, 1936, that, after the traditional two years, H. T. Richardson was succeeded by W. L. Rybolt, president of the Rybolt Heater Company, Ashland, Ohio.

The manufacturers of furnaces and their appurtenances were now offering something more than so many pounds of iron or steel. They were providing equipment of attractive appearance which could be automatically operated and could furnish any or all phases of indoor comfort controlled by the simple touching of a button and even that was only necessary occasionally. Mechanical design and installation of furnace plants had become an exact science.

Millions of furnaces were in use and while many of them were in good physical condition the improvements which had come in equipment had made many of these out of date, thus affording an opportunity for replacement and it was estimated that in addition to these, two million of the furnaces in use were so worn as to be due for replacement.

All of this was a real and new opportunity for the industry and for the Association.

Robinson-Patman Act

About this time a new law was passed by Congress. It was known as the Robinson-Patman Act and its announced purpose was to help industry, not destroy it, and to eliminate unfair trade practices. The act permitted a company to sell to whom it wished and at any price it saw fit providing it did not sell the product below cost, which cost the vendor must be able to prove. Further, all purchases in a certain class must be sold at the same price and given the same allowances, and discounts for quantity must be justified. These were the main points covered by the law although there were others.

That Advertising Campaign Again

At this period the Association, still realizing its desirability, canvassed the possibility of inaugurating another cooperative advertising campaign. The membership felt a wide dissemination of educational material would educate the public to a proper conception of air conditioning and identify the furnace system as the best means for furnishing it in homes.

The plan contemplated at that time provided for an expenditure of at least $25,000 during the first year and a larger amount annually thereafter. It was found that some of the members were willing to subscribe generously to the necessary funds, but that others, for various reasons, were not so much interested. Thus, the amount subscribed, while sizeable, did not justify the undertaking and it was decided with regret to allow the matter of an advertising and publicity campaign to rest until a later date.

Automatic Controls

By 1936 automatic control equipment was fully appreciated and the design of control equipment had been perfected to meet the problems presented by furnace systems.

Many of those in the industry will recall the appre-

W. L. Rybolt, elected president in January, 1936.

ciation of zone control which came to heating contractors about that time and how materially it assisted in securing the desired results in larger installations and houses of the more or less rambling type. Through the Association much information was furnished to the industry as to just how zone controls worked and why zones must be selected with care and why a system of controls must be chosen that would meet the particular needs of each house.

Furnaces Become Big Business

Another interesting change was noted which affected the commercial side of the business. For years the purchase price of what would pass at the time as a rather good furnace installation ranged from $150 to $300 but with the new equipment a plant for the same house was being sold for from $400 to $1500 with many plants justifying a considerably larger expenditure by the home owner.

The conventional, somber furnace of earlier years was gradually taking on eye appeal and many of the restyled units with their square enameled casings done in colors and trimmed with chromium were most attractive. The furnace plant was no longer regarded as a necessary evil. Its utilities were increased and there was also a marked improvement in the technique of retail display and sale.

Under the leadership of the Association the furnace business was rapidly being placed upon a higher plane.

It may be safely stated that during 1937 the matter of sales was not one of the Associations problems for the supply hardly equalled the demand. It was increasing costs, new legislation, industrial disputes and production which were causing the industry much real anxiety.

The New York Meeting

In January, 1938, the Association met in New York City as at that time the Fifth International Heating and Ventilating Exposition was being held in the Grand Central Palace with the displays of over three hundred manufacturers filling the five large floors of that building. The use of bright colored paint and enamel with chromium trim had come into such general use as finishes for the industrys products that the show was a riot of color and most attractive.

With the American Society of Heating and Ventilating Engineers and the National Warm Air Heating and Air Conditioning Association meeting at the same time the second joint session of the two organizations was conveniently possible and proved as successful and profitable as the initial joint meeting in Chicago in 1936.

The programs of this joint meeting and of the Association's convention indicate what was then in the minds of the membership. Among the subjects considered were, "What's Ahead in Residence Building," "The Legislature Straight-jacket on Business," "Cooperation with the Architect," "Air Distribution from Sidewall Outlets," "Condensation within Walls," "The Trend in Furnace Sizes," "Heat Losses and Temperature Drops in Forced Air Ducts," "Recent Developments in the Filtration of Air" and "Meeting Outside Competition or Comparative Values."

This last topic was presented by Frank E. Mehrings, of the Meyer Furnace Company, Peoria, Illinois. Mr. Mehrings in a unique manner arrived at a fair price for a furnace by comparing its services and usefulness with that of some commonly known and used articles.

For instance, he pointed out that an electric washing machine which was selling at the time for from $80 to $145 was in actual use about two and one-half hours a week or one hundred thirty hours per year and assuming it lasted twenty-five years and is worth $80 for its total 3240 hours of service the same arithmetic would show that a furnace keeping the home comfortable eight months out of twelve or 145,000 hours in twenty-five years would be worth about $3600.

By comparing a $300 piano on the same basis he proved at least to his own satisfaction that an ordinary furnace was well worth $4800. If his comparisons were fanciful they were also refreshing and did indicate the very splendid service which even the most ordinary furnace furnished at a very small annual cost.

"Winter Air Conditioning" Printed

During the Research Session of this January, 1938, convention the Research Advisory Committee made two most interesting announcements. One was that the Research Residence was to be insulated and that tests would be made when that was done. The other was that the Association was about to publish a book on forced air heating, the title of which would be, "Winter Air Conditioning." The Association's Board of Directors had already given its approval and the editor would be Professor S. Konzo of the Association's Research Staff at the University of Illinois.

As may be supposed this announcement met with enthusiastic approval. The book was published as promised in 1939 and contained 532 pages giving the results of the Association's research in winter air conditioning and forced warm air heating supplemented with data from other sources and comments by the editor.

1944 Private Construction

WITH about 150,000 new privately-financed dwelling units called for this year by the war housing program of the National Housing Agency, private builders have about as big a war housing job as last year when 158,000 privately-financed war units were started, say Federal Housing Administration.

This year's war housing job will be highly concentrated in a relatively small number of vital war areas where employment is still expanding. About 65 per cent of all privately financed housing will be started in 20 localities from present indications.

In more than 800 other localities, private war housing quotas have been met or are nearing completion.

On January 1, 115,000 units remained to be started under existing quotas. Although the war production situation may bring considerable changes in the war housing picture, current estimates by the National Housing Agency indicate that private quotas will be established for 30,000 to 35,000 more units during the next few months. This increase plus the unused quota on January 1 means a housing job close to 150,000 privately-financed units.

Breaking down the unused national quota on Jan-

(*Continued on page* 115)

On Our Industry's Front

Materials Situation

THE War Production Board's Conservation Division has just issued its eleventh "Material Substitutions and Supply List," which shows an easing of copper and steel. The report emphasizes, however, that "easing" applies rather to the raw materials than to facilities or manpower for fabricating them.

This official list carries some 450 materials needed in the war effort, arranged in three groups. Group I shows those whose supply is insufficient for essential needs, Group II those in approximate balance, and Group III those in excess of essential requirements.

The total number of materials classified by the Conservation Division in Group I is slightly smaller than that in October's report. Tin continues to be short in supply, an exception to the general improvement in the supply of nonferrous materials. It is recommended that tin be used as little as possible in bronzes and plating. Nickel and malleable iron are in Group I.

Group II metals (those in balance) include: aluminum, copper, lead, zinc. Group III metals (excess production) include: cast iron and pig.

◆

Furnace Smoke Pipe

OBTAINING sufficient advanced allotments of steel to maintain a level rate of production was designated as the principal problem of the smoke and stove pipe industry.

Orders for sheet steel, according to the Industry's Advisory Committee, must be placed well in advance of the time the supply is actually needed, since delivery under present conditions takes from three to six months. For this reason, committee members requested that their advance allotments be increased sufficiently to take care of the delivery time lag. Although the demand for smoke and stove pipe at the distribution level is a seasonal matter, production should be continuous in order to build up inventories sufficient to meet demands during the heating season, committee members pointed out.

The industry's labor problems are also closely connected with the continuity of production, members stated. If no steel is available to manufacture stove and smoke pipe, workers must be temporarily laid off until more steel comes in. During the period of inactivity many workers find other jobs and do not return to the manufacture of stove and smoke pipe.

The committee also explored the possibilities of having a specified amount of steel set aside for the manufacture of smoke and stove pipe. The amount of steel required could be ascertained by means of a program determination which would take into consideration the estimated requirements of the various claimant agencies. In planning such a program consideration would also be given to availability of facilities and labor and to the production history of the industry. The material set aside under such a program would be allocated quarterly among the various manufacturers under the Controlled Materials Plan. The principal advantage of such a plan would be that manufacturers would know approximately how much material they could plan on for future production. The committee agreed that such a program should be prepared and presented through the proper channels for a decision.

Although no indications of a shortage of stove pipe at the consumer level have reached the War Production Board, committee members said that they had received complaints from their jobbers as to the supply of pipe. It was the consensus of opinion that although consumer requirements are being met reasonably well, the supply of stove and furnace pipe at the jobbers' level is tight. Jobbers, it was believed, have practically no inventories, and when new shipments arrive they immediately distribute them to dealers who had previously placed orders with them.

Since Code 586 of the Controlled Materials Plan covers other items such as registers, grilles and warm air distribution pipe, in addition to smoke and stove pipe, it is difficult to determine production figures for smoke and stove pipe alone. For this reason, the committee agreed to a recommendation that manufacturers send in monthly reports giving a breakdown of equipment produced from materials allocated under the Controlled Materials Plan. These reports are to include figures on production, shipments, and unfilled orders expressed in tons of materials required. Accumulation of this information will enable the Plumbing and Heating Division to make sure that requirements of the various claimant agencies for these products are satisfied in accordance with the program determination.

◆

FHA's Summer Conservation

TO ASSIST homeowners to conserve critical fuels by "winter conditioning" their homes, FHA will present a "summer plan" of insured financing for fuel conservation work.

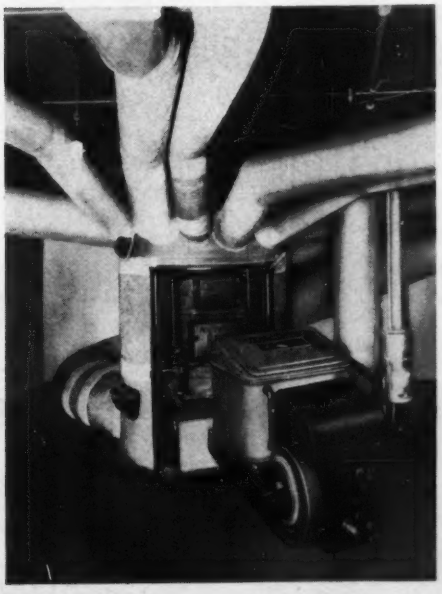
Under the plan loans can be made and work done during the coming spring and summer, with first payments deferred until as late as November 1.

Installations to conserve fuel are of great importance because of the acute fuel shortage which will probably get worse before it gets better, FHA states. Intensive efforts have been made during the past year by several Government agencies to encourage homeowners to conserve fuel by "winter conditioning" their homes. This program will continue during the coming months. The FHA "summer plan" should help many homeowners to install much-needed fuel conservation measures, such as insulation, weatherstripping, and storm sash and servicing of equipment.

Through Title I operations, FHA insured loans are available to finance conversions in amounts up to $5,000, repayable in regular installments over a period as long as 7 years. Essential repairs may be financed through FHA insured loans up to $2,500, repayable in one year in most instances. FHA insured fuel conservation loans may be obtained in amounts up to $2,500 and are repayable in regular installments over a term as long as 3 years.

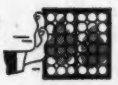
RESIDENTIAL AIR CONDITIONING

SECTION



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

One way to clean up at house-cleaning time

If shortages of help and materials are making your business pretty tough, here's a happy suggestion that will enable you to clean up a mighty nice bunch of profits this Spring . . . just follow these easy directions: Get the Spring 1944 DUST-STOP*  selling plan from your DUST-STOP distributor. It includes every sales aid you need—all free—all geared to the season and the times. Pick up your phone right now and start the ball rolling.

Why Dust-Stops mean business NOW!

IT'LL SOON be house-cleaning time . . . that's also the ideal time to get blower-equipped furnaces all clean and set for summer use. In fact, it's a safe bet that clean, new Dust-Stops are needed in every forced-warm-air furnace in your community—because they're loaded with the winter's dirt.

National advertising has told about Dust-Stops

All through the past winter, national advertising in magazines has been telling millions about the importance of changing Dust-Stops. And many of these people now may be wondering who is their local Dust-Stop dealer . . .

Now comes Dust-Stop's Spring campaign to identify you as local Dust-Stop headquarters.

So don't miss this opportunity. Get in touch with your Dust-Stop distributor today, or write to *Owens-Corning Fiberglas Corporation, Toledo 1, Ohio. In Canada, Fiberglas Canada, Ltd., Oshawa, Ontario.*

FIBERGLAS* DUSTOP* AIR FILTERS

*T. M. Reg. U. S. Pat. Off.

Checking the Warm Air Ducts In a Gravity Heating System

By S. Konzo

Special Research Professor, Engineering Experiment Station
University of Illinois

IN "TROUBLE SHOOTING" gravity warm air heating systems the following case is typical of many calls. The house inspected was about 35 years old and was originally heated with a parlor stove and a kitchen range. Some 20 years ago a gravity warm air system was installed. At the time of installation the system was considered adequate and most satisfactory to the home owner, primarily because he did not expect nor want to heat the second story bedroom to a temperature of 70 deg. F. But times have changed, the home owner is older, his standard of comfort has changed, and one bedroom has been rented to a roomer. Now the home owner wants to know how to handle the particular bedroom that is not satisfactory to the roomer. In all other respects the furnace plant is still satisfactory.

A case history of this nature reminds one of the close parallel between the heating man and a doctor. A competent medical man gets all the available facts, fancies and hallucinations from his patient before prescribing a treatment. The heating contractor has a similar procedure to follow. He at least tries to obtain a few pertinent facts from opinions, prejudices and "belly-achings" that are served to him in carload lots with freight prepaid.

Out of this period of confidences and following an inspection of the plant, the following facts emerge:

A bedroom on the second story is some 10 to 15 deg. cooler than the rest of the house. Room is 12 ft. by 15 ft. with 9 ft. ceiling. Three windows, each 20 sq. ft. in area, with no weatherstripping, no storm sash and quite loose. No insulation in sidewalls or attic. Room exposure, 135 sq. ft. gross wall exposed to north and 108 sq. ft. to west.

One 8 by 10 in. warm air register in floor near the door, stack is 10 by 3 in., and leader is 12 in. in diameter, 12 ft. long and with two elbows. The leader pipe was increased in size from a 9 in. to a 12 in. pipe about four years ago and very little improvement was noted. Even keeping bedroom windows closed at night does not help to bring room temperature up to 60 deg. in cool weather.

"What should be done?" asks the home owner. So get out your pencil and follow along on this diagnosis and check the prescription. The procedure was as follows:

a) Determine calculated heat loss from the room. For this purpose we recommend the standard short form given in Table 1 in the new Gravity Manual, which is obtainable at 40 cents from the National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland (14), Ohio. Here is a tabulation of the heat loss calculations:

Item	Area or cubage	Factor for 80 deg. diff.	B.t.u per hr. loss
Windows	60 sq. ft.	90	5,400
Net exposed wall	183 sq. ft.	20	3,660
Cold ceiling	180 sq. ft.	26	4,680
Infiltration	1,620 cu. ft.	2.2	3,560
Total loss			17,300

b) What are the requirements for the room as it now stands? See Table 3 in the Manual, which is reproduced in this article and which is for second story registers. The second group of values is for two elbows in the warm air run. The sixth column is for a 12 ft. run of the leader pipe. We note that a Unit No. 12 has a rated capacity of 8,460 B.t.u. per hour. Hence, two No. 12 units will give close to 17,000 B.t.u. per hour.

c) What are the standard sizes of equipment for Unit No. 12? See Table 5 in the Manual, which is reproduced in this article. For Unit No. 12 we find a 9 in. leader, connected to a 12 by 3¼ in. stack, leading to an 8 by 12 in. floor register. We should have two No. 12 units in the room and all we actually have is a 10 by 3 in. stack connected to a 12 in. leader.

d) What is the capacity of the existing run? By referring to Table 5 we find that a 10 by 3¼ in. stack (or Unit No. 11) corresponds most closely to the existing stack. It is true that the leader pipe is 12 in. instead of 8 in., but in this case the stack is the "bottle neck" of the system and the additional capacity resulting from the use of the oversized leader is small and can be neglected.

From Table 3 we find that Unit No. 11 with two elbows and a 12 ft. leader length shows 7,050 B.t.u. per hour, which is 10,000 B.t.u. per hour short of requirements.

Table 1
HEAT LOSS FACTORS

Description	Heat Transmission Coefficient U	Heat Loss Factor (Multiply values shown by exposed areas in sq. ft.) Design Temperature Difference, deg. F. 40	50	60	65	70	75	80	85	90	100
Exposed Walls											
No. 1											
(a) Frame, wood siding, paper, sheathing, studs, lath and plaster	0.25	10	13	15	16	18	19	20	21	23	25
(b) Same as (1a) substituting ½" rigid insulation for lath	0.19	8	10	11	12	13	14	15	16	17	19
(c) Same as (1a) with ½" flexible insulation between studs in contact with sheathing	0.17	7	9	10	11	12	13	14	14	15	17
(d) Same as (1c) with two air spaces	0.15	6	8	9	10	11	11	12	13	14	15
(e) Same as (1a) with 3½" rock wool or equivalent between studs	0.08	3	4	5	5	6	6	7	7	7	8
(f) Same as (1a) substituting 25/32" rigid insulation for wood sheathing	0.19	8	10	11	12	13	14	15	16	17	19
(g) Same as (1a) with composition siding over wood siding	0.21	8	11	13	14	15	16	17	18	19	21
(h) Same as (1a) substituting asphalt or asbestos shingles for wood siding	0.30	12	15	18	20	21	23	24	26	27	30
(i) Same as (1g) substituting ½" rigid insulation for lath	0.22	9	11	13	14	15	17	18	19	20	22
(j) Same as (1g) with ½" flexible insulation between studs in contact with sheathing	0.19	8	10	11	12	13	14	15	16	17	19
(k) Same as (1i) with two air spaces	0.17	7	9	10	11	12	13	14	14	15	17
(l) Same as (1g) with 3½" rock wool or equivalent between studs	0.08	3	4	5	5	6	6	7	7	7	8
No. 2											
(a) Clapboards or wood siding, studs, lath and plaster	0.35	14	18	21	23	25	26	28	30	32	35
(b) Same as (2a) with composition siding over wood siding	0.28	11	14	17	18	20	21	22	24	25	28
No. 3											
(a) 8" Brick wall—plain	0.50	20	25	30	33	35	38	40	43	45	50
(b) Same as (3a) plastered on one side	0.46	18	23	28	30	32	35	37	39	41	46
(c) Same as (3a) furred, lath and plaster one side	0.30	12	15	18	20	21	23	24	26	27	30
(d) Same as (3a) substituting ½" rigid insulation for the lath	0.22	9	11	13	14	15	17	18	19	20	22

Table 5

Units 1 to 5 — **FIRST STORY WARM AIR DUCTS**

Unit No.	Leader Pipe Diameter, Inches	Register Size, inches		
		a	b Baseboard	
		Floor	Size	Extension
1	8	8 x 10	10 x 8	2¼
2	9	9 x 12	12 x 8	2¼
3	10	10 x 12	12 x 9	3¼
4	12	12 x 14	13 x 11	5¼
5	14	14 x 16	.....	.....

Note—When the calculations indicate a requirement for a given room greater than unit number 4, two or more smaller units totalling the required capacity are recommended.

Units 11 to 16 — **SECOND STORY WARM AIR DUCTS, SINGLE WALL STACKS AND FITTINGS**

Unit No.	Leader Pipe Diameter, Inches	Stack * Size Inches	Register Size, Inches			
			a	b Baseboard		c
			Floor	Size	Extension	Sidewall
11	8	10 x 3¼	8 x 10	10 x 8	2¼	10 x 8
12	9	12 x 3¼	8 x 12	12 x 8	2¼	12 x 8
13	9	13 x 3¼	8 x 14	12 x 8	2¼	12 x 8
14	10	14 x 3¼	8 x 14	12 x 8	2¼	12 x 8
15	12	12 x 5¼	.....	12 x 10	3¼	.....
16	12	14 x 5¼	.....	13 x 11	3¼	.....

* Recommended stack sizes. Tables may also be applied to 3" and 3½" stack depths.

Units 21 to 24 — **SECOND STORY WARM AIR DUCTS, DOUBLE WALL STACKS AND FITTINGS**

Unit No.	Leader Pipe Diameter, Inches	Stack Size, Inches		Register Size, Inches			
				a	b Baseboard		c
		Internal	External	Floor	Size	Extension	Sidewall
21	8	2½* x 10	3⅛* x 10⅝	8 x 10	10 x 8	2¼	10 x 8
22	8	3 x 10	3⅝ x 10⅝	8 x 10	10 x 8	2¼	10 x 8
23	9	2½* x 12	3⅛* x 12⅝	8 x 12	12 x 8	2¼	12 x 8
24	9	3 x 12	3⅝ x 12⅝	8 x 12	12 x 8	2¼	12 x 8

*Commercial sizes vary ⅛ inch. from values shown.

e) The first alternative is to decide whether another stack can be installed. If it could be added, a No. 13 or No. 14 unit is required. In most existing homes this is not easily accomplished. In some installations an exposed stack can be run on the inside of a wall into a floor register.

f) What is the second alternative? Usually it is better practice to try to knock down the heat loss to fit the actual installation. In this case we need a 10,000 B.t.u. per hour reduction. Can we get it? If we use tightly fitting storm windows and 4 in. ceiling insulation, we obtain the following reductions in heat loss:

Item	Area or cubage	Factor	B.t.u. per hr.	Reduction
Windows	60 sq. ft.	36	2,160	3,240
Infiltration	1,620 cu. ft.	1.3	2,106	1,450
Cold ceiling	180 sq. ft.	7	1,260	3,420
Total				8,110

If we could insulate the sidewalls with 3⅝ in. fill insulation, we could get an additional reduction of 2,380 B.t.u. per hour.

g) The two alternatives both require some drastic action and the final decision is up to the home owner. In most cases, the alternative of using storm windows and insulation should be recommended if comfort heating and not mere temperature attainment is the objective.

Many installers might raise the logical question: "Why all this fuss and bother and calculation when I could have told the home owner the answer without it?" You could have. Remember, however, that some other installer told the home owner after a snap analysis that a 12 in. leader in place of the 9 in. size would be all that was necessary. It was not. The home owner is not trusting "quack" practitioners any more than you would trust a "quack" doctor. This written explanation of the calculation procedure requires more time than it does to make the actual check. In actual use of this method, in which the home owner can follow every step of the procedure, the required time was from 10 to 15 minutes. You have the calculations and figures all down in writing, and the confidence instilled by your methodical and business-like procedure will do more good than 30 minutes of oratory condemning someone else's work.

Now how does this matter of checking the warm air duct system tie in with fuel conservation? This may be summarized in five rules, as follows:

Rule No. 1—Whenever a heating plant has to be "pushed" to undesirably high temperatures in order to favor a "hard to heat" room, the fuel consumption

Table 3

WARM AIR CARRYING CAPACITY B. t. u. DELIVERED SECOND STORY REGISTERS

Length of leader pipe—in feet

Unit No.	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'
B. t. u. delivered with ONE ELBOW											
11-22	8370	8140	7900	7670	7430	7190	6950	6710	6470	6240	6000
12-24	10040	9760	9470	9190	8900	8520	8330	8050	7770	7480	7200
13	10880	10570	10260	9960	9650	9340	9030	8730	8420	8110	7800
14	11710	11380	11050	10720	10390	10060	9720	9390	9060	8730	8400
15	16200	15750	15300	14840	14380	13920	13460	13000	12550	12100	11640
16	18920	18390	17850	17310	16780	16240	15710	15180	14640	14100	13570
B. t. u. delivery with TWO ELBOWS											
11-22	7940	7720	7500	7280	7050	6830	6600	6370	6150	5930	5700
12-24	9540	9270	9000	8730	8460	8190	7920	7650	7380	7110	6840
13	10340	10050	9750	9460	9170	8880	8580	8290	8000	7700	7410
14	11120	10810	10500	10180	9870	9550	9230	8920	8610	8290	7980
15	15400	14970	14530	14100	13670	13230	12800	12360	11930	11500	11070
16	17980	17470	16960	16450	15950	15430	14830	14420	13910	13400	12890
B. t. u. delivery with THREE ELBOWS											
11-22	7530	7320	7110	6900	6680	6470	6250	6040	5830	5620	5400
12-24	9030	8780	8520	8270	8010	7750	7500	7240	6990	6730	6470
13	9800	9520	9240	8960	8690	8410	8130	7850	7580	7300	7020
14	10530	10240	9940	9650	9350	9050	8750	8450	8160	7860	7560
15	14580	14180	13780	13370	12950	12530	12120	11710	11300	10890	10480
16	17040	16550	16070	15580	15110	14620	14140	13660	13180	12700	12210
B. t. u. delivery with FOUR ELBOWS											
11-22	7120	6920	6720	6520	6310	6110	5900	5700	5500	5300	5100
12-24	8530	8290	8050	7810	7570	7330	7080	6840	6600	6360	6120
13	9250	8990	8720	8460	8200	7940	7680	7410	7150	6890	6630
14	9950	9670	9390	9110	8830	8550	8260	7980	7700	7420	7140
15	13780	13390	13000	12610	12220	11830	11440	11050	10670	10280	9890
16	16080	15620	15170	14710	14260	13810	13350	12900	12440	11980	11530
B. t. u. delivery with FIVE ELBOWS											
11-22	6700	6510	6320	6130	5940	5750	5560	5370	5180	4990	4800
12-24	8040	7810	7580	7350	7130	6900	6670	6440	6220	5990	5760
13	8710	8460	8210	7970	7720	7470	7230	6980	6730	6490	6240
14	9370	9110	8850	8580	8310	8050	7780	7510	7250	6980	6720
15	12970	12600	12240	11870	11500	11140	10770	10400	10040	9680	9310
16	15140	14710	14280	13850	13420	13000	12570	12140	11710	11280	10850

No. 21 For B. t. u. values multiply 11-22 values by .83
No. 23 For B. t. u. values multiply 12-24 values by .83

Notes for Table 3

a. "B. t. u. deliveries" shown in Table 3 apply only to baseboard locations of warm air registers. **When floor registers are used deduct 15%** from the "B. t. u. deliveries."
b. Consider each 45 degree elbow as equal to one-half of a 90 degree elbow.
c. Consider the two sharp elbows in a cross-over connection as equivalent to three 90 degree round elbows.
d. Consider each 90 degree offset between boot and stackhead equal to one 90 degree round elbow.

will be excessive.

Rule No. 2—The sum of the hourly B.t.u. capacities of the warm air ducts should be approximately the same as the hourly B.t.u. rating of the furnace, regardless of what the square inches of capacity of both may be.

Rule No. 3—In a freely circulating gravity warm air system the average temperature of the warm air from a register should not have to be much in excess of 150 deg. F. even in extremely cold weather.

Rule No. 4—In checking on the requirements for a "hard to heat" room, first consideration should be given to the possibilities of reducing the heat loss from the room by the use of calking, weatherstripping, storm sash, and insulation. This is usually a more satisfactory procedure than merely adding warm air or return air ducts, although this may have to be done.

Rule No. 5—The furnace heating contractor should offer as part of his complete heating service, facilities for applying calking, weatherstripping, storm sash, and insulation. No other service man is in as favorable a position to know the heating requirements for a house.

Some specific questions concerning Tables 2, 3 and 5 have been brought to our attention and the replies are as follows:

1) Is the warm air industry going to drop the "square inches of leader pipe" as a basic unit of measurement?

Yes. One square inch of leader pipe may be equivalent to 111, or 136, or 167 B.t.u. per hour register delivery under certain specified lengths of pipes, temperature of air, and method of installation. It has served a useful purpose in the past. In the future the B.t.u. method will be the accepted one. The procedure given in the new Gravity Manual can be taught a beginner in the trade in half a day.

2) Are the sizes of leader pipes, stacks, and registers shown in Table 5 accepted by industry?

Yes. The sizes shown are recommended standard sizes voluntarily adopted by the register manufactur-

Table 2

WARM AIR CARRYING CAPACITY B. t. u. DELIVERED FIRST STORY REGISTERS

Length of Leader Pipe—in Feet

Unit No.	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'
	B. t. u. delivery with ONE ELBOW										
1	6020	5850	5680	5510	5340	5170	5000	4830	4660	4490	4320
2	7620	7400	7180	6970	6760	6540	6320	6110	5890	5680	5460
3	9400	9140	8870	8600	8340	8070	7810	7540	7270	7010	6740
4	13350	12970	12590	12210	11830	11450	11080	10700	10320	9950	9560
5	17520	17020	16530	16040	15550	15050	14550	14050	13560	13060	12560
	B. t. u. delivery with TWO ELBOWS										
1	5850	5660	5490	5330	5160	5000	4840	4670	4510	4340	4180
2	7360	7150	6940	6730	6520	6320	6110	5910	5700	5500	5290
3	9090	8840	8580	8320	8060	7800	7550	7290	7040	6780	6520
4	12910	12540	12170	11800	11430	11060	10690	10320	9950	9580	9210
5	16940	16450	15990	15500	15040	14550	14080	13600	13120	12650	12150
	B. t. u. delivery with THREE ELBOWS										
1	5620	5460	5310	5150	4990	4830	4670	4510	4350	4190	4030
2	7120	6910	6710	6510	6310	6110	5900	5700	5500	5300	5100
3	8780	8530	8280	8030	7780	7530	7290	7040	6800	6550	6300
4	12450	12100	11750	11400	11050	10700	10350	10000	9650	9300	8950
5	16360	15900	15440	14970	14510	14050	13600	13130	12660	12200	11750
	B. t. u. delivery with FOUR ELBOWS										
1	5420	5260	5110	4960	4800	4650	4500	4350	4190	4040	3890
2	6860	6660	6460	6270	6080	5890	5690	5500	5300	5110	4910
3	8460	8220	7980	7740	7500	7260	7020	6780	6550	6310	6070
4	12010	11670	11330	10990	10650	10310	9970	9630	9290	8950	8610
5	15770	15320	14880	14420	13990	13540	13100	12650	12200	11750	11310
	B. t. u. delivery with FIVE ELBOWS										
1	5240	5090	4940	4790	4640	4500	4350	4200	4050	3910	3760
2	6630	6440	6250	6060	5880	5690	5500	5320	5130	4940	4750
3	8180	7950	7720	7490	7260	7030	6800	6560	6330	6100	5860
4	11610	11290	10950	10620	10300	9970	9640	9320	8990	8660	8320
5	15250	14800	14380	13950	13520	13090	12650	12230	11800	11370	10940

Notes For Table 2

a. Table 2 applies to baseboard and floor locations of warm air registers.
b. Consider each 45 degree elbow as equal to one-half of a 90 degree elbow.
c. Consider each 90 degree offset between boot and stackhead equal to one 90 degree round elbow.

ers and fittings manufacturers.

3) What is to prevent an installer from connecting a 12 in. leader pipe to a 12 by 3¼ in. stack?

Nothing. There is nothing to prevent a man from kicking himself in the shins if he likes that sort of entertainment. As time goes on and the standard sizes shown extend into all phases of industry, factory made boots and stackheads that deviate from the standard will not be available.

4) Will standardization of sizes reduce costs?

It should. Approximately 75 per cent of catalogued items in pre-war catalogues can be knocked out, their patterns and dies scrapped, and their warehouse bins emptied. Fewer sizes and models, sold in greater quantities, should eliminate part of the confusion of ordering material, reduce costs of storage and installation, and at the same time improve the standards of performance of the heating plant.

5) I have a lot of odds and ends of registers and fittings. What will happen to them if the F. H. A. and the city ordinances adopt these standard sizes?

Make use of all odd and non-standard equipment now and get rid of them. Clean house now and prepare for the standardization program in the post-war period.

6) How far have these standardized sizes been publicized?

Every live-wire fittings and register company that has any sort of post-war planning in progress will base their planning on these sizes. The 1944 issue of the ASHVE Guide will show the tables given here. Copies of the Manual have been sent to FHA and other governmental agencies and to various city engineers.

7) Can we expect industry-wide standard sizing for forced-air work?

Yes, although such sizes have not been definitely decided as yet.

8) We have been making 3 in. stacks and 3½ in. width stacks and now you show a 3¼ in. width.

The 3¼ in. width is the most practical size. In the post-war period it will be advisable to discard the other two sizes and use the single width. This width will also be the standard for forced-air systems.

9) Why all this fuss and bother about gravity systems? Isn't the forced-air unit going to take over the entire warm air field?

No. The industry has a big job to do in coming years in training men to become competent heating contractors in both fields. The adoption of a uniform B.t.u. method of figuring heat losses and figuring sizes of equipment for both gravity and forced-air systems will simplify the task of training. And there's nothing wrong with a good gravity system.

10) Are these tables based on research data?

Absolutely. If you are interested and want to know how the tables were derived, send a request to the

(*Continued on page* 108)

Stoker Service Refinements Which Improve Operation* [Part 2]

By Walter Knox†

Section II—Air Supply

EVERY pound of average coal requires approximately fourteen pounds of air for proper combustion. This air must be properly distributed. It also must be subject to some control or adjustment to meet the varying requirements of different types of coal, different furnace and draft conditions, and different thicknesses of fuel beds.

Well designed tuyere ports (air holes) in the retort will be so made as to give proper air distribution and also so as to let as little fine coal and ashes as possible down into the windbox below. The air going through the tuyeres not only gives oxygen to the fire but also performs the very important function of keeping whole the retort coal. If a section of a retort burns up it is safe to assume the tuyere ports in that section were first covered with clinkers or other material. The tendency of manufacturers at the present time is to make their retorts smaller and with less tuyere port area. By this means sufficient air pressure can be maintained to keep all tuyere ports free of fine coal and ash.

All manufacturers make use of a centrifugal fan, either of the multi-blade or paddle wheel type. Because it is the necessary static pressure rather than the volume of air that is hard to maintain, the tendency today is towards narrower fans of greater diameter. All of these fans have the characteristic of delivering more air against a slight back pressure than against a high back pressure; therefore, they deliver more air with a shallow fuel bed than they do with a deep fuel bed, which is the reverse of what might be wished for.

However, this characteristic is not as bad in actual practice as the automatic air control enthusiasts would have us believe. This is true because under burning conditions the resistance does not vary as drastically as has been assumed, especially since a properly designed retort will provide a large part of the total resistance. In practice it is possible to do a very good job of adjusting the air with a manually controlled damper.

Few of the automatic air controls do better than maintain a constant volume of air, regardless of the resistance. However, there is no question but that a well designed air control does cut down part of the excess air normally delivered to a shallow fuel bed. Such a control is a step in the right direction. However, most of the automatic air controls need to be adjusted, the same as a manually operated damper, whenever there is a change in coals or a decided change in the load.

Adjustment of the air can best be made when there is an average fuel bed, say of six to eight inches in depth on the smaller home size of stoker. There should be a bright clear flame with no smoke and yet there should be only a few sparks.

It is best to run a stoker with a fairly deep fuel bed since such a fuel bed is generally more efficient.

Section III—Care of the Fire

It takes only a few minutes every day (or every two or three days in mild weather) to care for a stoker fire but a home owner should be impressed with the fact that although the job is easy and simple it should be done regularly and in a specific way. Before going into details let us examine the results of neglect of a fire.

Failure to properly clean and care for a fire, simple as it is, can be traced down as the direct cause of many troubles, plugging up of tuyeres, burning out of retorts, fires going out, shearing of pins, disintegration of hearth, smoke back, etc.

Naturally, if clinkers are left in until they get in and over the retort the result will be crushing of coal and finally shearing of safety keys. But a fire requires more than simply removing the large clinkers. If the small clinkers and loose ash are left undisturbed around the extreme edges of the fire they will in time form a "dish pan" effect that makes the fire build higher and higher. Then the home owner pokes around blindly in the accumulation, looking for clinkers, poking coal and ashes into the tuyere ports. Also, a dirty fire puts a greater load on the stoker, is less efficient, and is generally unsatisfactory.

Cleaning the Fire

The clinkers will form around the retort at the bottom of the fuel bed. This is assuming a good stoker and sufficient hearth area in the furnace. Working from the outside of the hearth in towards the retort, lift these clinkers up with a bar and remove with the clinker tongs. Then using a small rake, or even the clinker tongs, rake any small clinkers and loose ash up around the edges of the fire. It may be necessary in mild weather to run the stoker for a few moments to fuse this accumulation into clinkers. At any rate leave them in place until the next cleaning period.

In extremely mild weather it may be possible to go for several days without removing clinkers but under ordinary conditions it is a very good policy to clean the fire once a day if for no other reason than that which is made a daily habit is seldom forgotten.

Installation

There are several points in the installation of a

(*Continued on page* 102)

*Address before Virginia Retail Coal Merchants Meeting.
†Formerly, The Koppers Coal Co., presently, H. D. Conkey Co.

Where, When, Why — Barometric Dampers

As announced in the January issue, materials for 400,000 domestic heating plant barometric dampers have been made available by WPB. The purpose behind this allocation of materials is to save fuel by increasing the overall operating efficiency of the average heating plant. How barometric dampers increase efficiency was explained in the January article. This article explains where to put the control; what to do with dampers already in place; how to adjust the control; what is the proper draft; what the control won't do. Most of these suggestions were offered by E. A. Field, Jr., H. D. Conkey & Co.

THE article in the January issue describing the advantages brought about in combustion efficiencies through the use of controlled chimney draft (use of an automatic draft control) assumed that furnace dealers knew all about these regulators—knew where to place the control; how to adjust it; what to do with already-in-place dampers. The truth seems to be that while most every reader has put in draft controls, there still remains too much misconception and too little basic understanding.

Therefore, with the help of the barometric damper manufacturers, the following question and answer article has been prepared to summarize the basic principles of controlled draft. If any question still remains unanswered AA will be glad to get an answer.

1. *Where should a draft control be installed—in the chimney or on the smoke pipe or breeching?*

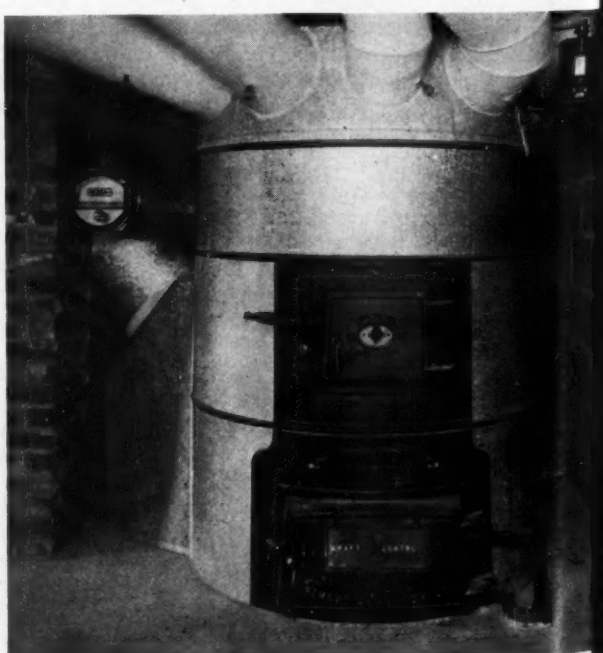
The best location is always on the smoke pipe as close to the furnace as possible (as at A, Fig. I) for open check type controls and as close to the chimney as convenient for internal dampers. Regulation will be much better for the reason that if the control were in the chimney the friction in the smoke pipe and chimney, which retards the flow of gases, will affect the action of the control. The important thing is that regulation be correct *at the furnace*—regardless of what may prevail in the chimney. There will be a more pronounced difference in the drafts over the fire during the "on" and "off" periods, of the burner, if the open check control is located quite a distance from the heating plant.

The second choice of location, where there is not room enough to place it on the smoke pipe, is in the chimney, but the unit must be placed up *on a level with the opening in to the chimney;* or perhaps a little above, but never down below. However, a control in the chimney should not be set too close up under the ceiling, as this is contrary to accepted practices as far as fire hazards are concerned. A control installed in the chimney can be placed on any side. The round style control should never be installed in the base of a chimney (as at C, Fig. I), unless there is no other available spot. When located down near the floor, the air entering through the control has to make a right angle turn upward, and because of this, together with the roughness of the inside of the chimney, the volume of air is reduced and the control will not regulate very closely.

That there is some disagreement on this problem of location, is indicated in comments from Preferred Utilities Mfg. Corp. as follows:

"Barometric draft controls, if properly sized and constructed, automatically maintain constant the desired draft. They perform this function by reducing the existing draft through lowering the temperatures of the gases in the stack and adding friction to the flow of the gases in the stack due to the increased volume of gases being handled by the stack. Therefore, it is theoretically correct and has been proven practically correct in our years of field experience to expect to obtain just as good draft control when the draft controls are placed directly in the stack as can be obtained when they are installed in the breeching. Further, theory and practice both prove that a barometric control can be installed either at the level of the entrance of the breeching into the stack or at any point below the entrance of the breeching to the stack."

In case there is a very long run of smoke pipe, such



Barometric damper installed in smoke pipe (between check and chimney) of a hand-fired, coal burning furnace. Photo from The Hotstream Heater Co., Cleveland.

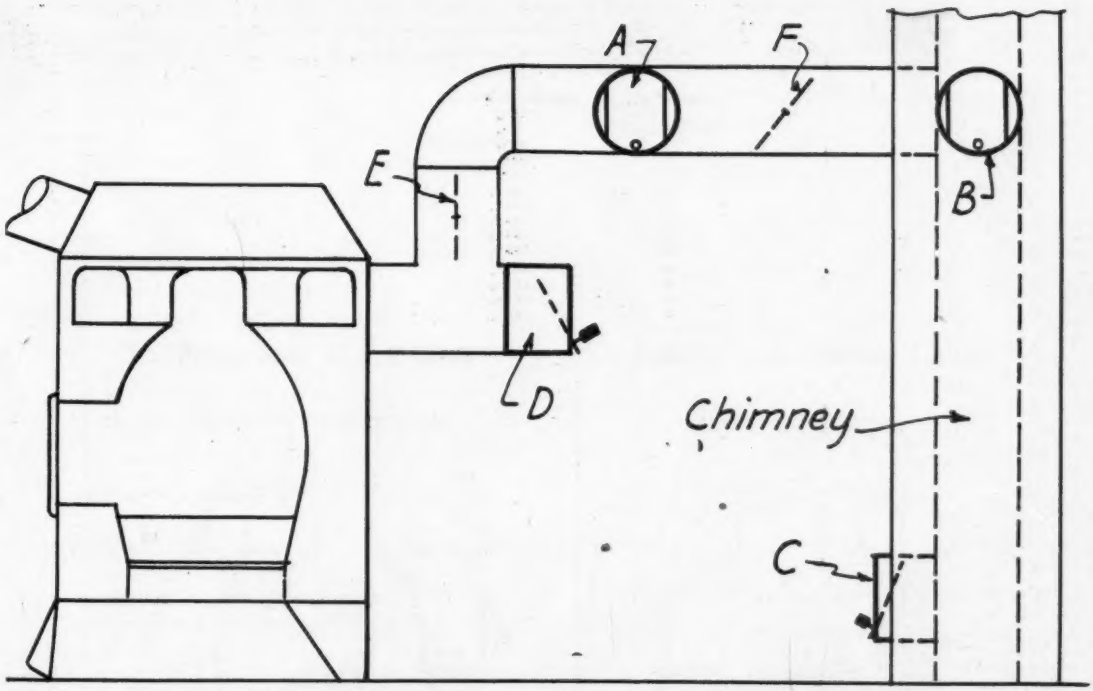


Fig. 1—Diagrammatic sketch of a barometric damper placed in several locations as explained in the text and a hand-turn damper. The effect of a hand-turn damper must be thoroughly understood for maximum effect.

as 10 or 12 feet of 8 or 9 inch pipe, it might be better not to install a control at all. The reason is that during a long "off" period of a burner, the horizontal run of pipe and the chimney will cool considerably, and when the burner again starts there will be very little draft. For a matter of seconds or perhaps minutes, the burner is quite likely to smoke or puff back, and the customer is more than likely to close the control in an effort to obtain as much draft as possible. Afterwards, the drafts probably will increase; and there will be an excess, but with conditions as described, it is better to omit the draft control, or it will be blamed for something for which it is not responsible.

This is not nearly so true of internal dampers since, practically, no air is admitted to the smoke pipe there is very much less cooling of the chimney. But a long run of smoke pipe often causes gassing around the furnace door when the burner first starts.

2. *If a hand damper (turn damper) is already installed in the smoke pipe, where should the draft control be located?*

The control should be located on the furnace side of the damper. If the damper is located very close to the furnace, leaving no room for a draft control, then the turn damper must be left wide open. If it is partly closed in an effort to supplement the draft control, there will be a very marked difference between the "on" and "off" period drafts. In Fig. I damper "E" would restrict the smoke passage and, consequently, during the "on" period the draft control would have to be set to maintain a rather high draft to induce enough of the gases out of the furnace past the restriction of the damper. Then, when the burner shuts down the strong draft in the smoke pipe would become effective as the volume of gases passing by the damper would be less, and its restrictive effect negligible. For instance, if .04 inch draft were desired over the fire, and the damper "E" were partly closed, it might be necessary to maintain .08 inch or .10 inch at the draft control (at A). Then, if the burner were to shut down, the draft over the fire would increase to approximately the same high value (of .08 inch to .10 inch) and cause rapid cooling of the furnace and a waste of fuel.

The above applies to both open check and internal damper controls, but the hand damper is not very effective with the internal damper, so the hand damper had better be removed or fastened full open always.

It *is* permissible to use a damper at the position "F," Fig. I, restricting the smoke pipe a certain amount, although there must always be an opening large enough to permit all of the gases from the furnace to escape. The only purpose in using a damper at "F" would be to supplement the draft control in case the chimney drafts are abnormally strong. Generally speaking, it is better to leave all turn dampers wide open. It is also recommended that the draft control in every case be a full size unit, as it does not pay to try to cheat on size. The difference in cost between a full size control and one just a little under size is very small, but the performance is decidedly better with a large unit.

With hand fired coal burning plants, a turn damper located between the barometric control and the furnace may sometimes be used if desired. This damper can be turned to maintain medium or low fires and the draft control itself acts as a limiting device, providing just enough draft for the maximum desired burning rate. The same results can also be accomplished by eliminating the turn damper and by opening or closing the ash pit draft door to reduce the burning rate below the maximum for which the draft control would be set.

On this point Preferred Utilities Mfg. Corp. engineers suggest:

"In view of the fact that the barometric draft control holds automatically a constant draft at the point of location of the draft control, a hand damper, if

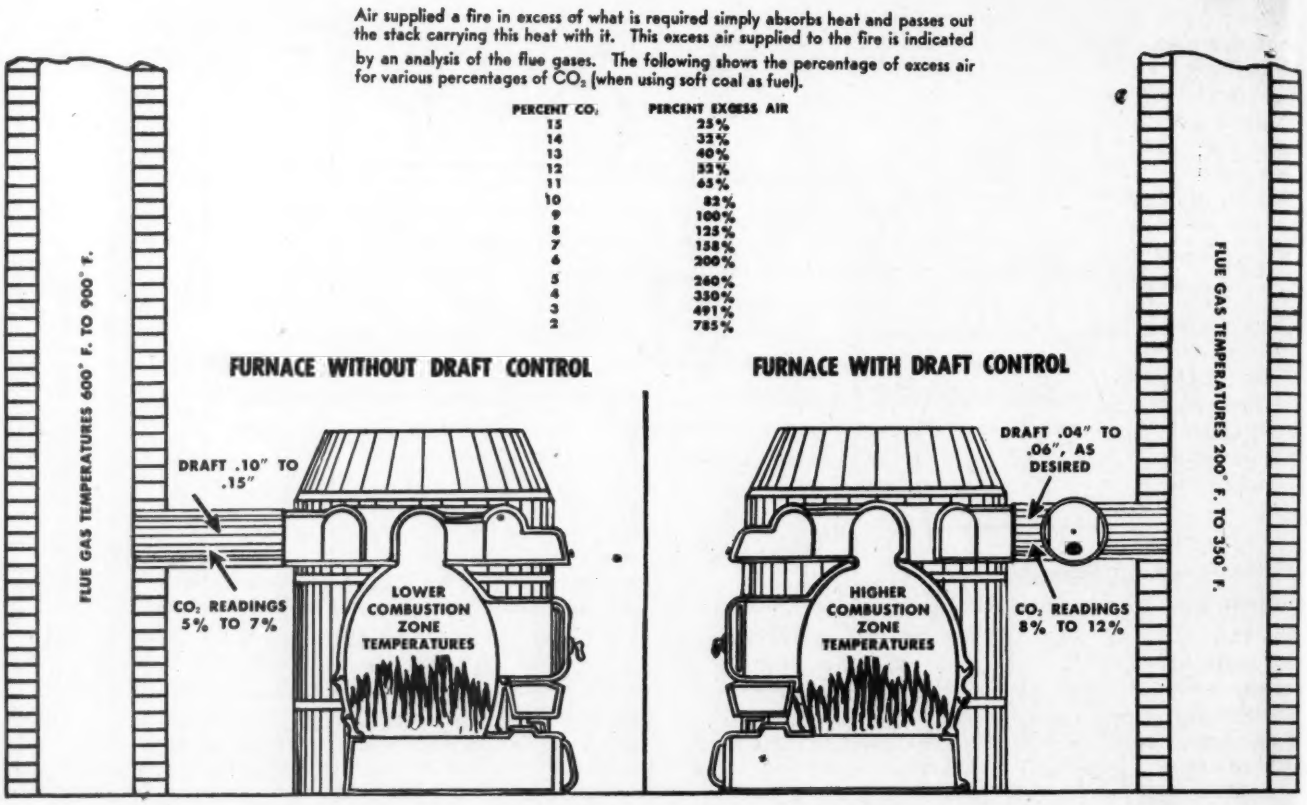

Air supplied a fire in excess of what is required simply absorbs heat and passes out the stack carrying this heat with it. This excess air supplied to the fire is indicated by an analysis of the flue gases. The following shows the percentage of excess air for various percentages of CO_2 (when using soft coal as fuel).
PERCENT CO_2 PERCENT EXCESS AIR
15 25%
14 32%
13 40%
12 52%
11 65%
10 82%
9 100%
8 125%
7 158%
6 200%
5 260%
4 350%
3 491%
2 785%
FURNACE WITHOUT DRAFT CONTROL
FURNACE WITH DRAFT CONTROL
FLUE GAS TEMPERATURES 600° F. TO 900° F.
FLUE GAS TEMPERATURES 200° F. TO 350° F.
DRAFT .10" TO .15"
CO_2 READINGS 5% TO 7%
LOWER COMBUSTION ZONE TEMPERATURES
DRAFT .04" TO .06", AS DESIRED
CO_2 READINGS 8% TO 12%
HIGHER COMBUSTION ZONE TEMPERATURES

Fig. 2—These two sketches show what happens to CO_2 and combustion chamber temperatures when chimney draft is uncontrolled and when draft is maintained by a barometric damper.

desired, should be placed between the draft adjuster and the furnace because in such position it can reduce the constant draft maintained by the draft adjuster if a reduced draft is desired for temporary periods. Generally, it is our opinion that it is best not to furnish or have installed a hand damper because this proves a means for one unacquainted with the problem of combustion to upset the good work performed by the party installing and setting the barometric draft adjuster to function properly on any particular job.

For a hand fired plant, a check damper is not recommended. If already installed it should be left closed.

3. *How should a draft control be adjusted?*

Without a draft gauge there are one or two methods that are used quite frequently. One is to open the slide in the fire door of a stoker-fired heating plant and place a piece of newspaper over the openings. The draft should be strong enough to hold the paper against these openings, but perhaps permit the paper to flutter a little. The draft control can be adjusted, reducing the draft until the paper begins to fall away from the openings and then the draft increased just enough to again hold the paper in place.

Another method is to keep the slide openings closed but open the fire door about 1 inch and check with a match to see if the flame is drawn inward and that no smoke comes out, particularly at the moment the stoker starts. There should be only just enough draft to accomplish this. Both of these methods are rather haphazard.

The best method, of course, is to use a draft gauge, taking readings over the fire with the fire door and the slide closed. For a domestic stoker, drafts of .02 inch over the fire are enough except that there is a danger that accumulations of dirt or ash might choke the passages until the draft would drop too low. To avoid this, it is a common practice to set the over-fire draft at from .04 inch to .05 inch. A commercial stoker probably would need overfire drafts of .08 inch up to .10 inch. A domestic burner can often operate on drafts of .02 inch to .03 inch over the fire, and with a commercial oil burner drafts of .05 inch to .06 inch up to .10 inch are good. However, with oil it is essential to take CO_2 readings as well, as there is a wide variation in the design and operation of commercial oil burners, some of them requiring drafts of as much as .4 or .5 of an inch.

4. *Can a draft control be installed on the end of a tee as at "D," Fig. 1?*

This is a poor location for a control, as the smoke and gases from the furnace tend to drive into the back or inside of the control, striking the back side of the gate, affecting its action. Also, air entering through the control may affect the stack switch, installed in the smoke outlet of the furnace back of the "T," causing a safety shutdown. In addition, with a stoker or hand-fired plant, ash and dirt may accumulate in the control. A barometric draft regulator should always be turned so that the gases pass by the unit, or in other words, the control should be set with its collar projecting out at right angles to the direction in which the gases are flowing. Incidentally, a barometric draft control checks the draft both by cooling the gases and by introducing a cross flow of air into the pipe which causes a turbulent condition, blocking the gases flowing from the heating plant.

5. *Should the control be adjusted when the stoker or oil burner is on or off?*

The regulator should always be adjusted when the burner is running and after it has been on long enough

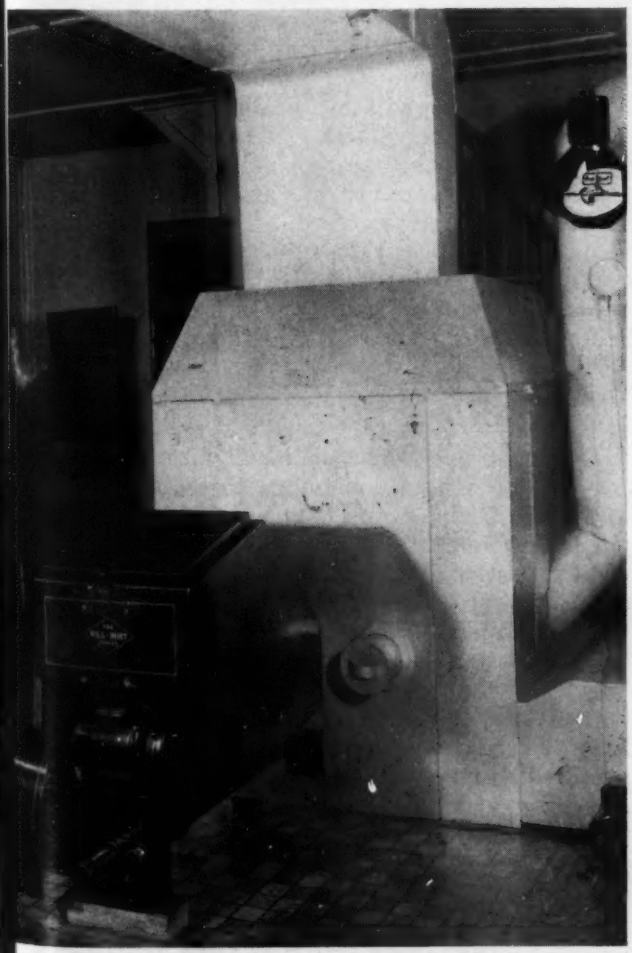
to thoroughly warm the heating plant and perhaps the chimney also. However, it is wise to take draft readings during the "off" period, as a comparison of the "on" and "off" period drafts gives valuable information. A great difference between the two draft readings may indicate an overloaded heater and burner. It may mean dirty flue passages, or it may also indicate an improperly adjusted burner.

6. *Is it better to take draft readings in the smoke pipe or over the fire?*

Of course, it is wise to take both kinds of readings, but the over-fire reading is the important one. With different types of boilers and furnaces, the smoke pipe or breeching drafts often have to be quite different even though the same over-fire drafts are carried, due to the difference in the friction and draft losses through the heaters.

7. *Should the draft control have a different setting in the summer than in the winter?*

With any automatic burner it is advisable to leave the rate of firing adjusted to one particular setting throughout the entire heating season. In other words, the rate of fuel feed, the fan pressure and the drafts should remain the same, and during a time when the loads are heavy the burner will simply run a greater proportion of the time. Therefore, the draft control should be set once and then left at that particular setting at all times. The draft control is automatic and will adjust itself to changes in winds and weather without attention.



A barometric damper in the smoke pipe of a stoker-fired furnace is essential for maximum efficiency and fuel conservation. Photo from The Hotstream Heater Co., Cleveland.

8. *Should the draft control be readjusted if the coal is changed?*

As a general rule, the draft control should not be readjusted for reasons given in question 7. It would only be in case a very radical change was made in the fan pressure that any change would be necessary with the draft control, and it is very seldom that such unusual changes occur.

The motive force that controls the volume of air that will be supplied to a bed of coal is the fan pressure plus the minus draft reading. It is obvious that if a fine grade of coal is used that packs in the retort or combustion chamber of the stoker that more draft or air pressure will be required to overcome the resistance to the air flow through the coal bed, and therefore the fan air pressure would need be increased or the draft increased to provide against the resistance to air flow set up by coal that packs more tightly and resists the entrance of air through the coal bed.

9. *Won't the air volume control on a stoker reduce the draft low enough, both during the "on" and "off" periods without the aid of a draft control?*

This is a touchy subject. However, there is generally some leakage of air past the dampers or shutters used in most air volume regulators which permits air to reach the fuel bed. But more important, the amount of air that filters in through cracks and openings around the fire doors and through the boiler settings is extra-ordinarily large, amounting to quite a big percentage, if relatively high drafts are being maintained. This air absorbs heat and may even cause rapid burning of the fuel, thus supplying unwanted heat and causing waste.

10. *Will a draft control eliminate smoke?*

The answer is no. In some cases it will aid, but it depends upon the conditions of the particular plant if very excessive drafts have been used. Sometimes a reduction in draft will produce higher combustion chamber temperatures and aid in reducing smoke, but no general rule can be given.

11. *If a draft control is installed, will it cure down drafts?*

The conventional barometric draft control will not eliminate down drafts. The gate of the control will close entirely if there is a down draft, but the unit does not act as a down draft diverter such as is commonly provided with gas-fired furnaces.

12. *Are there any plants where a draft control should not be installed?*

In most cases a draft control is definitely of benefit, and certainly can do no harm. If the plant is greatly overloaded, it may be necessary that the stoker or oil burner have all of the draft which is available, and there would be no benefit by installing a straight barometric control. It might be advisable in such a case to investigate the possibilities of using a control with a motor attachment which would reduce the draft during the "off" period, conserving heat, and in the case of a stoker-fired plant, substantially banking the fire. However, make sure that the plant is

(*Continued on page* 109)

Sub-Floor Heating To Reduce Floor-to-Ceiling Temperature Difference

This is the second article on TVA's experiments in heating small basementless houses. Article I, describing the failure of circulating heaters to provide room-to-room and floor-to-ceiling temperature uniformity, was published in the September issue. This article shows that heating the space between the floor and the ground reduced temperature difference and brought added comfort—at no added cost.

THE comfort made possible by any heating equipment depends not only on the quantity of heat released but on its distribution. A heating system may maintain a normal room temperature at a predetermined level, such as the breathing line (5 feet above floor), and yet not afford a comfortable environment for the occupant. The temperature at the breathing line contributes little to the comfort of a person. Very little of the body is in contact with the air at or above the breathing line when a person is standing and none when he is seated. Warm air above the breathing line contributes to bodily comfort only in that it warms the material of the ceiling and reduces radiation from the body to the surface of that material. Hence there is an obvious fallacy in measuring the efficiency of a heating system according to the temperature maintained at any one arbitrary level.

Control of the temperature gradient within the space heated tends to become difficult when the heating system is of the gravity flow type. The local radiant-convection electric heaters in Norris houses depend on gravity flow (not fans) for their convective action. It was found by test that the difference between floor and ceiling air temperatures in typical Norris houses was from 5 to 8 degrees, depending upon the weather. Such a condition is not bad, but it might well be improved. A method of house heating was sought that would reduce the temperature difference between air at the floor and air at the breathing line, but that would not at the same time increase the temperature of the air above the breathing line.

Tests were conducted in a Type 41-CC house with the air in the subfloor space under the living room heated. The subfloor of the living room was chosen because good distribution of temperature is especially desirable in this room where a person sits in repose for long periods of time. The space under the living room was completely enclosed with a partition which consisted of building paper on the outside, 2″x4″ studs with the voids filled with glass wool, and ½″ rigid insulation board inside. The insulation value of this partition was sufficiently high to maintain the enclosed air at a nearly constant temperature. The access door to this subfloor space was of the refrigerator type, filled with glass wool and weatherstripped. The aluminum foil insulation normally under the floor of this house was removed under the living room so that it would not act as a barrier to radiant heat. As a convenient makeshift, two room-type portable heaters were used as heaters. These heaters were mounted in horizontal positions with the grille faces up. Reflecting pans of boards covered with aluminum foil were placed under the heaters to stop radiation of heat to the earth. In order to conserve heat lost through the partition enclosing the heated subfloor space, the foundation vents in the walls around the unheated subfloor space were closed. The rooms of the house were heated in the usual way by the standard radiant-convective electric heaters, the heaters in the subfloor space under the living room being used as an auxiliary heat source only.

Test Procedure

The house was warm at the beginning of tests, and the entire house, including the subfloor space under the living room, was heated continuously during each test. Each test was of about two days' duration. The purpose was to compare these experimental operative conditions with those obtaining normally, when the house is heated continously by standard electric heaters only (foundation vents open). Although part of the subfloor space of the house was unheated, the living room was not isolated from the remainder of the house. The average room temperature of each room was recorded. Thermometers were placed on the longitudinal axis of the room, 3 feet from each end wall, at heights of 4″, 1′, 2′, 3′, 4′, 5′, 6′, and 7′ above the floor (the ceiling height being 7′8″). The temperature of the air in the heated subfloor space was read from a thermometer in the floor. The sensitive bulb of a recording instrument was fastened to the floor surface

TABLE A

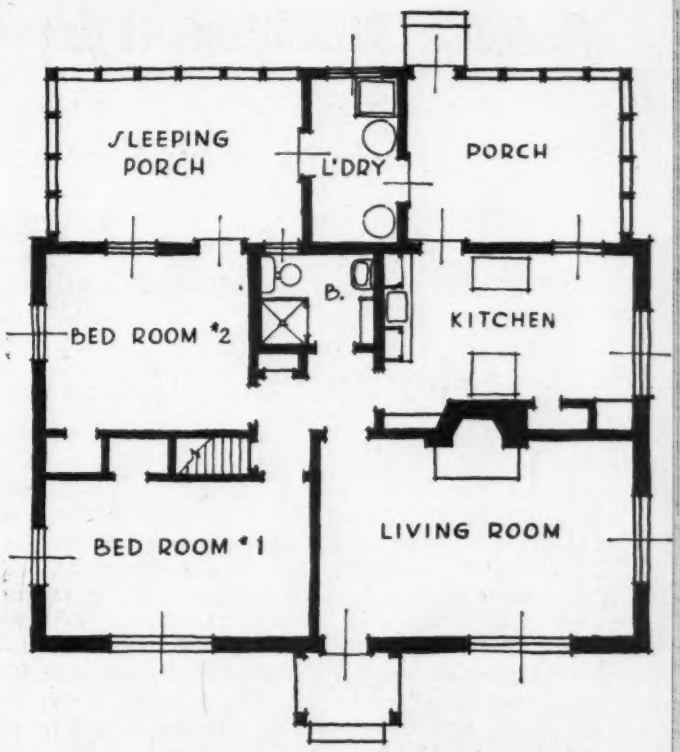
	Normal Heating	Heating with Subfloor Temperature at— 69.5° F.	85.9° F.
Average heat loss B.T.U. per degree hour	461	432.3	500.3
Living room temperature above floor:			
4"	65.38°	70.28°	71.17°
1'	65.8	70.55	71.17
2'	68.06	69.67	70.17
3'	70.31	72.1	71.06
4'	70.92	72.28	71.3
5'	71.48	73.1	71.5
6'	72.37	72.2	70.02
7'	73.1	73.28	70.85
Temperature difference 4" and 7' above floor..	7.72°	3.00°	0.32°
Surface temperature of floor..	Not Rec.	67.88°	70.6°
Outside temperature	40.1°	55.2°	48.7°

to record approximate surface temperature. Thermometers in the living room were read every thirty minutes from 10 a.m. to 3:30 p.m.

As a basis for this study, a "normal" heating test was first conducted without subfloor heating, during which comfort conditions in the living room were recorded. The foundation vents were opened, and the average temperature of the air in the subfloor space during this test was 34.8°. This was followed by two tests during which the temperature of the air in the subfloor space under the living room was maintained at averages of 69.5° and 85.9°. A comparison of data is shown in Table A:

Sub-floor Heating May Pay for Itself

From these data it may be concluded that it is possible to reduce or eliminate the temperature gradient by the means used. However, any form of heating that is supplementary to the principal heating system must, regardless of merit, be reasonably economical to use. Subfloor heating similar to that defined in the above tests probably is within the reach of occupants of small houses, since heating the subfloor air to 69.5° and 85.9° resulted in a heat loss for the entire house of from 6.2 per cent less than "normal" to 8.5 per cent more than "normal." By standard methods of heating, more economy might be realized, but with an appreciable sacrifice in bodily comfort. More scientifically designed equipment for heating the air in the subfloor space might result in a reduction of heat loss for the entire house which would make subfloor heating economically desirable. Therefore, it would seem that favorable consideration of the use of subfloor heating may



Floor plan of a TVA, Type 41-CC, basementless house in which the area under the living room was heated. Table A shows the better conditions resulting.

be based on its contribution to bodily comfort, coupled with an expectation of moderate operating cost.

Uniformity of air temperature in a room plus uniformity of inside surface temperature of the room boundaries promotes bodily comfort. These two factors of comfort conditioning account for about three-quarters of the body heat loss. In order to evaluate data relative to comfort accumulated during subfloor heating tests, the outside temperature must be taken into account. The temperature differential between air at the floor and air at the ceiling increases at the temperature differential between inside and outside air increases.

Warm Floors Increase Comfort

The limited data accumulated in subfloor heating tests indicate that, under the conditions which existed, maintenance of the air in the subfloor space under the living room approximately at room temperature did result in improved temperature distribution of the air in the living room. No definite conclusions can be drawn until extensive observations are recorded, testing various intensities of subfloor heat during periods of similar weather. Inside surface temperatures of room boundaries should approximate inside air temperatures. Walls and ceilings in typical Norris houses with "normal" heating approach this condition, but windows and floors do not. When the subfloor air was constant at approximately

(*Continued on page* 104)

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Tr. de School

4-Piece Tapering Transition Elbow

IN Fig. 60 is shown a side and front elevation of a four-pieced tapering transition elbow which will be laid out by using both the parallel line and triangulation method of development. In practical work, the front elevation is not at all necessary, but is shown here so as to make all steps clear. This is a four-pieced transition elbow from a round inlet to a rectangular outlet. In work of this kind care must be taken that the elbow has graceful tapering curves in the throat, heel and cheeks as indicated in the front and side elevations.

Computing the Areas

Assuming that the riser is to be 6 x 18 inches, the diameter of the round duct should have a similar area. Thus $6 \times 18 = 108$ sq. inches. Now consult a table of Areas and Circumferences. Follow the column of Areas and find 108.434, the nearest number to 108. Follow the line to the left to the column of Diameters which will suggest 11¾ inches or say 12 as shown in the front elevation.

Drafting the Side Elevation

Fig. 61 shows the rule for drafting the side elevation regardless how many pieces the elbow may have. Assume that the radius to the center of the cheek will be 12 inches as shown in Fig. 60, the side elevation of which is shown in Fig. 61. First draw any right angle as *7-A-C*^{v} in the side elevation. Using *A* as center with the desired 12 inch or any other radius, draw the quadrant *a-b*. As the elbow is to have four pieces, then count 1 for each end piece and 2 for each middle piece. $1 + 2 + 2 + 1 = 6$. Divide the quadrant *a-b* in six divisions as shown by the heavy dots on the *quadrant*. Now from the center point *A* draw radial lines indefinitely through the second, fourth and sixth dots indicated by *c-d* and *e*.

Assuming that the rectangular duct will be 6 x 18 inches with the 6 inch end on the cheek side and the round duct 12 inches in diameter, then set off 3 inches on either side of *a* and obtain *B*^{v} and *C*^{v} and 6 inches on either side of *b* and obtain *1* and *7*. From points *B*^{v}, *a* and *C*^{v} at the top, draw vertical lines to intersect the miter or joint line at *B*^{o}, *f* and *C*^{o} and from *1*, *b* and *7* at the bottom draw horizontal lines to intersect the miter or joint line at *1*^{o}, *4*^{o} and *7*^{o}. Now take the distance *C* to *f* on the upper miter line or *e* to *4*^{o} on the lower miter line (both being similar) and set it off from *d* to *h* on the center miter line, and draw the center line of the four pieced elbow as shown from *f* to *h* to *4*^{o}.

To obtain the proper taper joints on the center miter line at *D* and *G* in the side elevation, take the half distance of the lower miter line as *7*^{o}-*4*^{o} and set it off on any line as *7*^{x}-*4*^{x} below the semi-circle in the side elevation. Also take the half distance of the upper miter line as *C*^{o} to *f* and set it off from *7*^{x} to *f*^{x}. Bisect the distance *f*^{x}-*4*^{x} and obtain point *i*. Take the distance from *7*^{x} to *i* and set it off from the center point on the center miter line on either side, as from *h* to *G* and *h* to *D*. Draw lines from *B*^{o} to *D* to *1*^{o} in the throat and from *C*^{o} to *G* to *7*^{o} on the heel to complete the true outline of the side elevation.

As the width of the upper miter line *B*^{o}-*C*^{o} in the side elevation must have a true taper to point *4*^{o} on the lower miter line, then divide one half of the upper miter line *f-C*^{o} in two parts as shown from *f* to *t* to *C*^{o}. Take one of the parts as *f-t* and set it off on either side of the center point *h* on the center miter line and obtain points *E* and *F*. Draw lines from *B*^{o} to *E* to *4*^{o} and from *C*^{o} to *F* to *4*^{o} to complete a proportional taper.

Parallel Line Developments

The four pieces of the elbow shown in the side elevation have been designated I, II, III and IV. Pieces I and IV will be developed by the parallel line method as follows:

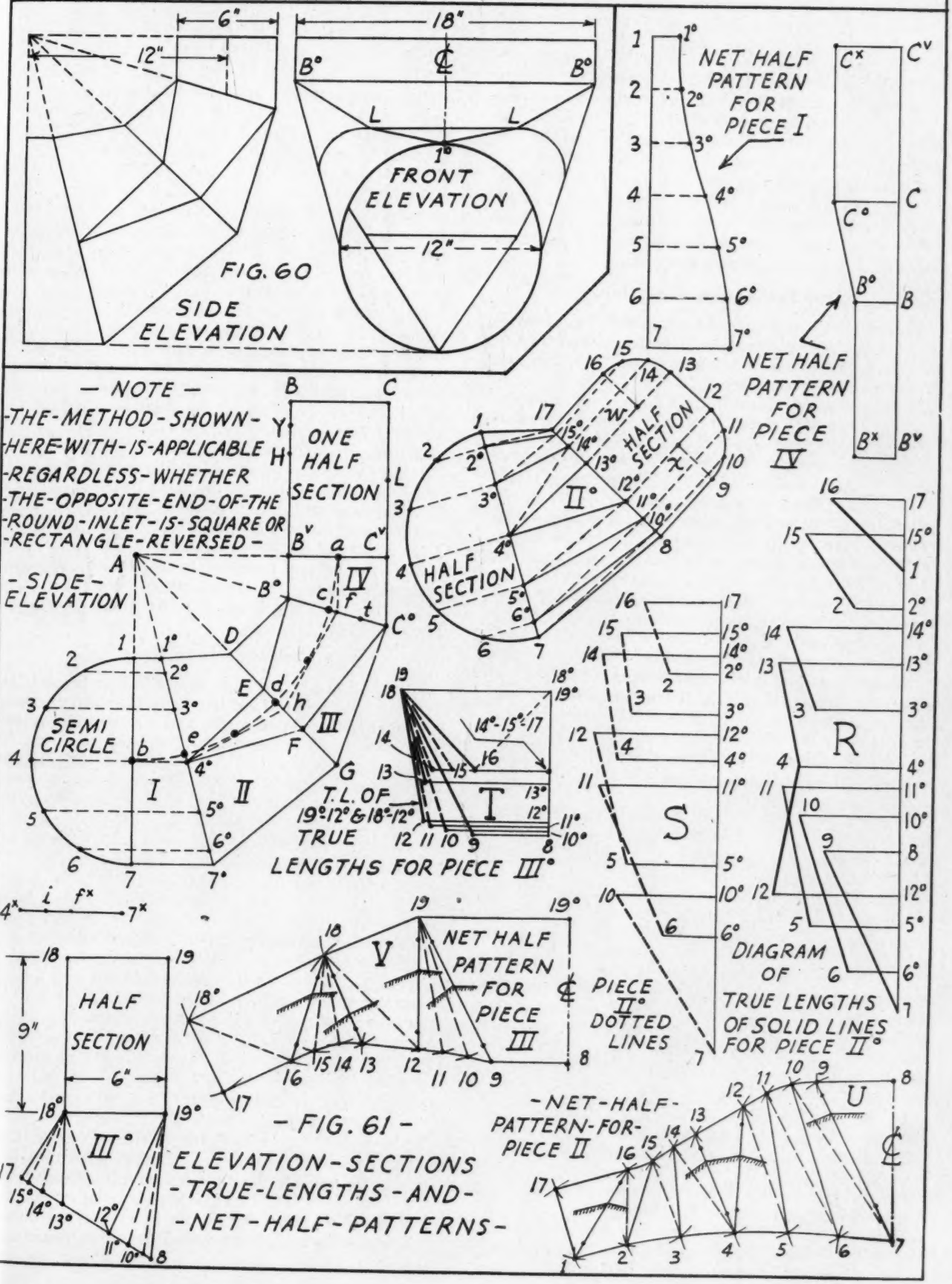
For the half pattern for piece I, use *b* in the side elevation as a center and draw the semi-circle shown, which divide into equal divisions as indicated by the small figures *1* to *7*. From the divisions *2* to *6*, draw lines at right angles to *1-7* to intersect the miter line *1*^{o}-*7*^{o} from *2*^{o} to *6*^{o} as shown.

Now take the girth of the semi-circle and place it on the vertical line *1-7* in the upper right hand corner as shown by similar numbers. From the small figures *1* to *7*, draw lines at right angles to *1-7* indefinitely as shown. Now measuring in each and every instance from the line *1-7* in side elevation, take the various projections to points *1*^{o} to *7*^{o} on the miter line and place these distances on similar numbered lines, measuring in each instance from the vertical line *1-7* in the half pattern for piece I as shown by the intersections *1*^{o} to *7*^{o}. Trace a curved line through the intersections so obtained then will *1-1*^{o}-*7*^{o}-*7* be the half net pattern for piece I shown in the side elevation.

To obtain the half pattern for piece IV in side elevation, place the half section of the 6x18 inch duct, above the line *B*^{v}-*C*^{v} in side elevation as shown. As *B*^{v}-*C*^{v} represents the 6 inch width of the rectangular duct, then at right angles to *B*^{v}-*C*^{v}, from the corners *B*^{v} and *C*^{v} erect the lines *B*^{v}-*B* and *C*^{v}-*C* each equal to one half of 18 inches or 9 inches as shown and draw

*All rights reserved.

-PATTERNS- FOR- A- FOUR- PIECED - TRANSITION — — ELBOW - ROUND - TO- RECTANGULAR —



the line *B* to *C*. Then will B^v-*B*-*C*-C^v represent the half section of the 6x18 inch duct.

Now take the girth of this half section B^v-*B*-*C*-C^v and place it on the vertical line C^v-B^v in the upper right hand corner as shown by similar letters, from which points draw lines at right angles to C^v-B^v indefinitely. Now measuring in each instance from the line B^v-C^v in side elevation, take the distances to B^o and C^o on the miter line, and place them on similar lettered lines in the half pattern for piece IV, always measuring from the line C^v-B^v and obtain the points of intersections marked C^x-C^o-B^o-B^x. Connect these points by lines, then will C^x-C^o-B^o-B^x-B^v-C^v be the one half net pattern for piece IV in side elevation.

The various divisions on the *miter cut* 1° to 7° in the half pattern for piece I and the various distances B^x to C^x on the *miter cut* in the half pattern for piece IV must be used when developing the half patterns for pieces II and III in side elevation.

True Sections on Miter Lines

Before the patterns can be developed for pieces II and III in the side elevation, it becomes necessary to find the true sections on the miter lines 1°-7°, *D-G* and B^o-C^o in the side elevation.

To avoid a confusion of lines take a reproduction of piece II in side elevation with the points of intersections 1° to 7° and *D-E-F-G* and place it to the right of the side elevation as shown by *1-7*, *17-13°-12°-8* which has been designated II°. At right angles to *1-7* in II°, from the various intersections 2° to 6° on the miter line *1-7* draw lines indefinitely. Now measuring from the line *1-7* in the semicircle in side elevation, take the various distances to points *2* to *6* and set them off from the line *1-7* in II° on similar numbered lines, thus obtaining the intersection marked *2* to *6*, through which points the semi-ellipse is traced. While this appears to be a semi-circle, it really is a semi-elliptical section on the miter line 1°-7° in the side elevation as well as in the reproduction piece II°.

By comparison, it will be found that the divisions between *1* and *7* in the half section in piece II° will be similar to the divisions between 1° and 7° in the half pattern for piece I. The next step is to obtain a proportional taper in the heel and throat of the elbow in front elevation, in Fig. 60, between the round duct at the inlet and the rectangular duct at the outlet, by using the following rule, which is shown in the front elevation in connection with the *throat* and which is also applicable to the heel.

Note that B^o-B^o represents the 18 inch length of the rectangular duct and 1° the zero point of the 12-inch duct. The problem is to find the distance *L-L* so that a proportional taper will result between *B-B* and zero 1°. As B^o-B^o is 18 inches and 1° is zero and as there are only two pieces involved, then *L-L* would be 18/2 or 9 inches. In other words, the half section of the rectangular duct C^v-*C* in Fig. 61 is divided into two spaces and the distance of either *L-C* or *L*-C^v is set off on the lines drawn at right angles to the line *8-17* in II° as shown by *17-16* and *8-9*.

If the tapering elbow in side elevation contained five pieces instead of four, there would be three middle sections. In that case the half section line C^v-*C* in side elevation would be divided into three divisions so that the given width would remain 18 inches, the next width 12 inches, then 6 inches to zero.

It now becomes necessary to find the true section on the line *D-E-F-G* in side elevation, so that a gradual taper will result between the half section *B*-B^v of the rectangular duct and the half section *b-4* in the semi-circle of the round duct. This section is found by setting off the distance *b-4* of the semi-circle, on the line B^v-*B* of the half section of the rectangular duct, as shown by B^v-*H* and then bisecting the distance *H-B* by the point *Y*. Now take B^v-*Y* and set it off in piece II° on lines drawn at right angles to *8-17* from points 12° and 13° as shown respectively by *12°-12* and *13°-13* and draw a line from *12* to *13*.

Now find the center points *X* and *W* which will strike curves tangent at *9* and *12* also at *13* and *16* respectively. Then will *8-9-12-13-16* and *17* be the true half section on *8-17* and *1-4-7* the true half section on *1-7*. As one half of the section *1-4-7* is divided in six divisions, then divide each quarter curves *9-12* and *13-16* into three divisions each, as shown. Now number all the divisions in the upper half section in II° as indicated from *8* to *17* and from points *10-11* and *14-15* draw lines at right angles to *8-17* to intersect this line at *10°-11°* and *14°-15°*. Connect by solid and dotted lines as shown.

Now take a reproduction of piece III in side elevation with the various points of intersections *D-E-F-G* and B^o-C^o and reproduce it as shown in the lower left hand corner as indicated *17-13°-12°-8°* and *18°-19°* in III°. All right angles to *18°-19°* erect the lines *18°-18* and *19°-19* equal to the distance B^v-*B* in the one half section of the rectangular duct in the side elevation. Draw lines in III° from *18°* to *18* to *19* to *19°*. As the section on the joint line *8-17* in piece III° will be similar to that on the joint line *8-17* in piece II°, then take all the intersections from *8* to *17* in II° and set them off in III° shown by similar numbers on *8-17*. From points *10°*, *11°* and *12°* in III° draw lines to the apex *19°* and from points *13°*, *14°* and *15°* draw lines to the apex *18°* also draw a dotted line from *12°* to *18°* so as to divide this irregular figure into two triangles.

True Lengths of Lines

The solid and dotted lines shown in both II° and III° represent the bases of sections to be constructed whose altitudes will be equal to the various altitudes having similar numbers in the two half sections shown in II° and the half section in III°. To find the true lengths of the solid lines shown in piece II° proceed as follows: Draw any vertical line below the half pattern for piece IV as shown by *17-7* upon which set off the lengths of all the solid lines contained in the piece marked II° as shown by similar numbers on the vertical line *17-7* at the right. For example, to find the true length of the line *1-17* in II°, set off this distance as shown by *1-17* on the line *17-7*. From point *17* draw a right angular line as shown from *17* to *16* equal to the height or altitude *17-16* in the upper half section of piece II°. Draw the solid line *16-1* in the true length diagram which has been designated *R*, which will be the true length of the line *1-17* in piece II°. Again, as an example, find the true length of the solid line *5°-11°* in piece II°. Set off this length on the vertical line *17-7* in *R* as shown from *5°* to *11°*.

From these two points draw the right angular lines *5°-5* and *11°-11* equal respectively to *5°-5* and *11°-11* in the lower and upper half sections in piece II°. The solid line drawn from *5* to *11* in the diagram of true lengths *R* will be the true length of the solid line *5°-11°* in piece II°. Proceed in this manner for the balance of all solid lines shown in II°.

The true length of the dotted lines in piece II° are

(*Continued on page* 106)

SHEET METAL SECTION

DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING

SHEETS

GALVANIZED

GALVANNEALED

HOT ROLLED

WITH this thumb indexed, Chicago Steel Service Company Stock List on your desk you have, at your fingertips, complete information on the best Galvanized - Galvannealed or Hot Rolled Steel Sheets for any job.

And:---

Whenever you face a tougher than usual fabricating problem . . . All you have to do is—Phone LAFayette 7210 and a C. S. S. Representative will help you solve it.

That's What We Mean By STEEL AT YOUR SERVICE

Here's another C. S. S. Co. Stock List especially prepared for those who are joining the swing to STAINLESS STEEL — The Metal Of A Thousand Uses. Better send for a copy — Its FREE.

CHICAGO STEEL SERVICE COMPANY

ASHLAND AVE. AT 39th ST. *The House of Stainless* **TELEPHONE LAFAYETTE 7210**

Refrigerant-Cooled, Spot-Welding Electrodes* [Part 2]

By Dr. F. R. Hensel,† E. I. Larsen,‡ E. F. Holt§

In view of the unsatisfactory conditions on the 100-kva. welder, it was decided to make further and more detailed tests on the 150-kva. press-type welder. On the larger welder it is possible to maintain conditions more nearly approaching those ideally suited for aluminum welding. Higher pressures and currents could be applied over a greater range and skidding of the electrodes could be reduced to a negligible minimum. A photograph, Fig. 3, is a view of the general test layout.

Holder and Holder Assembly

The general arrangement of the holders and electrode assembly employed in the final tests is shown in Fig. 6, and a sectional view of the platen-type holder and adaptor is disclosed in Fig. 7. The holder incorporates the same essential features as the adaptor and holder described

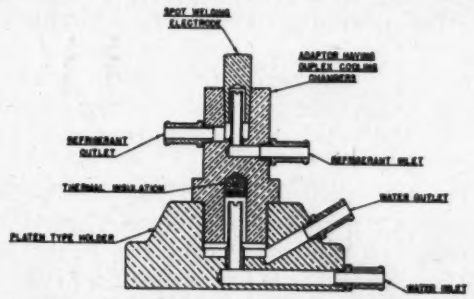


Fig. 7—Platen type holder and special electrode adaptor.

previously, including individual cooling chambers for water and refrigerant.

Both the platen holder and adaptor were made as short as practical in order to maintain a minimum spacing of the welder arms. This was done to reduce the area of the secondary loop and thereby obtain maximum output from the welder.

Test Materials and Surface Preparation

Material Welded and Preparation

The material welded during the final tests was 24 ST Alclad aluminum alloy and the material thickness was 0.040 in.

Immediately prior to any particular welding test the surfaces of the sheet were degreased in carbon tetrachloride and subjected to a mechanical cleaning. The mechanical cleaning was accomplished by wire brushing the sheet surfaces using a 6-inch diameter wire wheel brush having 0.003-in. diam. steel bristles and rotating at a speed of 3400 r.p.m.

Following cleaning, the material was welded within a period of not longer than 20 min., and in most instances, within 10 min.

Electrode Material and Preparation

The electrode design was similar to that used in previous tests shown in Fig. 5. This electrode design was used in the tests because it was a standard adopted by the Aircraft Resistance Welding Standards Committee. (*See Feb. A.A.*)

The electrode face was machined to a 2-in. spherical radius and prior to welding tests the electrode face was finished using a paddle-type electrode cleaner. This cleaner was faced on both sides with No. 320 Aloxite abrasive cloth and the abrasive cloth was backed up with approximately 0.098-in. thickness of sheet rubber. To polish an electrode, the paddle cleaner was rotated several times back and forth, while the electrodes were bearing against each side.

Table 4

(A)	Welding speed	50 strokes per minute
(B)	Welder Sequence	
	Delay time	8 cycles
	Weld time	8 cycles
	Squeeze time	15 cycles
(C)	Electrode force	1000 lb.
(D)	Welding current	Approx. 28,000 r.m.s. amp.
(E)	Electrode material	Elkaloy A
	Electrode Hardness	73 Rockwell B
	Electrode Electrical Conductivity	87% of I.A.C.S.
(F)	Weld Spacing	¾ between center lines

Welding Conditions

Welding conditions used in previous tests were not applicable for welding 24 ST Alclad due to the occurrence of cracks in the spot welds. A new set of welding conditions was established

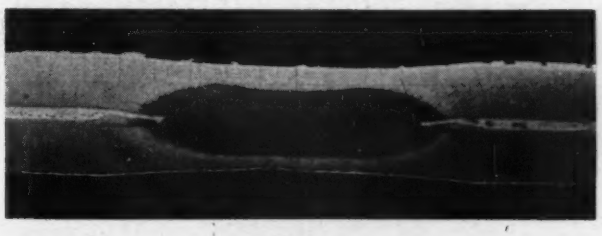


Fig. 8.

*Presented at the Annual Meeting, A.W.S., Cleveland, Ohio, Oct. 12 to 15, 1942.

†Metallurgical Consultant, P. R. Mallory & Co., Inc.

‡Division Manager, Metallurgical Engineering Dept., P. R. Mallory & Co., Inc.

§Senior Research Engineer, Metallurgical Engineering Dept., P. R. Mallory & Co., Inc.

to produce structurally sound welds in the Alclad alloy. The welding conditions standardized on are itemized in Table 4.

The shear strength in tension of single-spot specimens obtained with these conditions ranged from 740 to 851 lb. per spot. The dimensions of the spot weld may be observed in Fig. 8 which is macrograph at 7.5 diameters. These welds were free of cracks as disclosed by microscopical and X-ray examination.

Temperature Measurements on Welding Electrodes

The temperature increase during continuous welding at 50 spots per minute was recorded for a run of 20 welds, using water-cooled electrodes. It was shown by an oscillogram that at this welding speed the temperature of the welding electrode rises rather rapidly for the first 5 or 6 welds, reaching a quasi-equilibrium state after about 10 welds. Also, that the temperature increases steeply during the time the welding current is flowing, and afterward drops slightly until the welding current comes on for the next weld. The temperature recorder is sensitive enough to measure these comparatively slight changes in temperature.

In the water-cooling run the water temperature was +18° C. and the water flow rate through the electrodes was 1.70 gal. per minute per tip.

The results of two series of tests were tabulated for water-cooled electrodes and the tests were repeated, using refrigerant cooling of the electrodes. The rate of flow of refrigerant through the electrodes was 1.85 gal. per minute per tip. The temperature of the refrigerant-cooled electrodes at the start of the welding was —20° C.

The results of the temperature tests on water cooled electrodes are plotted graphically in Fig. 11, while Fig. 12 indicates the trend of the temperature rise using refrigerant-cooled electrodes. In switching from refrigerant to water-cooling, the refrigerant hose was disconnected from the electrode adaptor and replaced with the water

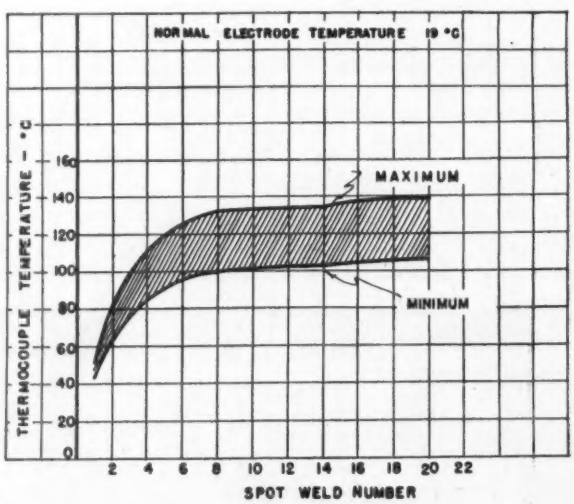


Fig. 11—Average from tests A43-2 and A43-1 water-cooled electrodes.

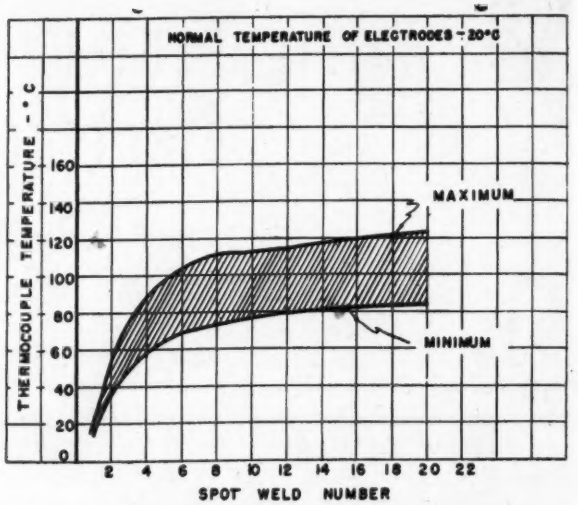


Fig. 12—Average from tests A42-1 and A42-2 refrigerant-cooled electrodes.

hose. No changes were made in the platen spacing.

By comparing the temperature conditions obtained with water cooling and refrigerant cooling, respectively, at the rate of welding investigated, several points are of importance.

1. The maximum electrode temperature attained with refrigerant cooling is somewhat lower than the temperature attained with water cooling.

2. The maximum temperature obtained with refrigerant cooling at a welding speed of 50 spots per minute is approximately 123° C. Since the original brine solution had a temperature of —36° C. the temperature differential is approximately 159° C.

The efficiency of the refrigerant cooling at this speed does not seem to be too impressive. It was observed, however, that the time required (recovery time) for the temperature to drop from that attained during welding, back to the normal temperature of the brine, was shorter in the refrigerant cooling than with water cooling. The recovery times were measured directly on the oscillograms and while it took approximately 16 to 19 sec. for the water-cooled welding electrodes to return to a water temperature of 20° C., it took only 5 to 6 sec. for the refrigerant-cooled electrodes to cool to 0° C. after having reached a maximum temperature of 123° C.

Relative Rates of Temperature Recovery

In previous tests it was noted that the temperature recovery interval following welding using refrigerant-cooled electrodes was more rapid than was the recovery using water-cooled electrodes. In order to study the advantages which refrigerant cooling of electrodes might have over conventional water cooling, it was necessary to check more closely the temperature recovery time and the effect of welding speed. Tests were made to investigate the relative time intervals necessary for the electrodes, with each type of cooling, to regain a definite temperature

Table 7

Test No.	Type Coolant	Normal Electrode Temp., ° C.	Flow Rate Gal./Min.	Coolant Pressure, High Side, Psi.	Recovery Temp., ° C.	Average Time to Recovery Temperature, Sec.	Average Spots per Min.	Maximum Temperature Attained at Thermocouple, ° C.
A34	Brine	—26	1.85	40	—20	9.23	6.42	35
A33	Brine	—26	1.85	40	0	3.56	16.27	58
A35	Brine	—26	1.85	40	+25	2.48	23.0	71
A36	Water	+25	1.65	15	25	7.16	8.25	82
A37	Water	+25	1.65	15	50	2.2	26.8	95

following a spot weld. The first series of tests was conducted using refrigerant-cooled electrodes having a normal temperature before welding of —26° C.

Welds were made at a rate of speed determined by the interval of time necessary for the electrodes to recover certain temperatures before making the next weld. All data were compiled from the temperature recording and chart speed on the Brush oscillograph.

For the refrigerant-cooled electrodes three recovery temperatures were established as follows:

Test A34....Interval to recover to —20° C.
Test A33....Interval to recover to 0° C.
Test A35....Interval to recover to +25° C.

Continuous recovery tests were repeated using water-cooled electrodes.

Test A36.....Interval to recover to 25° C.
Test A37.....Interval to recover to 50° C.

In Table 7 are tabulated the results of the recovery rate tests derived from runs of 20 consecutive spot welds. The elapsed time intervals were averaged over the 20 welds in each test run. During these tests the next succeeding weld in any run was made immediately when the electrode had returned to a particular recovery temperature. In all tests the delay, weld and squeeze periods were standard as given in the previous Table 4.

The results indicate that in order to permit the spot-welding electrode to recover normal temperatures following a spot weld, relatively slow rates of welding are necessary.

In the case of the refrigerant-cooled electrodes having a normal temperature of —26° C., an average of 9.23 sec. was required to return to —20° C. following a weld, and the maxium electrode temperature attained in any weld was 35° C.

In the case of water-cooled electrodes having a normal temperature of +25° C., an average of 7.16 sec. was required to return to 25° C. following a weld, and the maxium electrode temperature of any weld was 82° C.

The total temperature differential in both refrigerant- and water-cooling tests was approximately the same.

Temperature Gradient in the Standard Test Electrode

To investigate the distribution of thermal effects in the standard spot-welding test electrode, temperature rise measurements were made at predetermined locations in the nose of the welding electrode during continuous welding.

Thermocouples were placed in small holes drilled in the electrode in a manner similar to that already used and the holes were drilled almost to the center axis of the electrode at varying distances from the welding face.

The thermocouple bead was located, therefore, at the center axis of the electrode. In Fig. 15 a sketch is shown of the electrode and the position of the thermocouple wells, while in Table 8 the test data are compiled.

Table 8

Thermo-couple Position	Distance from Face, mm.	Temp., ° C. at 20 Spots Refrigerated Electrodes Max.	Refrigerated Electrodes Min.	Water-Cooled Electrodes Max.	Water-Cooled Electrodes Min.
A	1.41	118	94	134	113
B	3.05	106	90	127	105
C	4.60	82	70	107	96
D	6.18	74	50	100	78

The maximum and minimum temperatures given in the table are those taken from the oscillograms after a quasi-equilibrium temperature had been established in the electrode during continuous spot welding at a speed of 50 spots per minute. Each test was run through a series of 20 consecutive welds.

The maximum and minimum temperature range decreases progressively from the welding face toward the water hole for both refrigerant- and water-cooled electrodes. However, the temperatures reached in the water-cooled electrodes

(*Continued on page* 115)

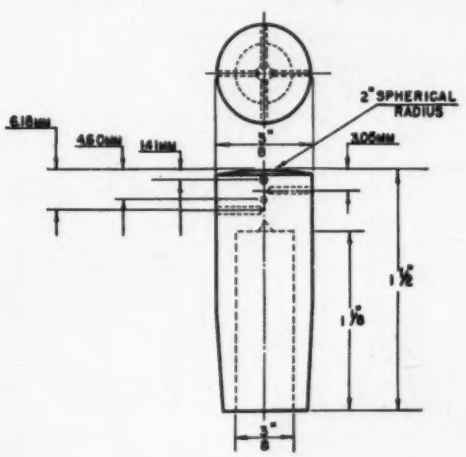
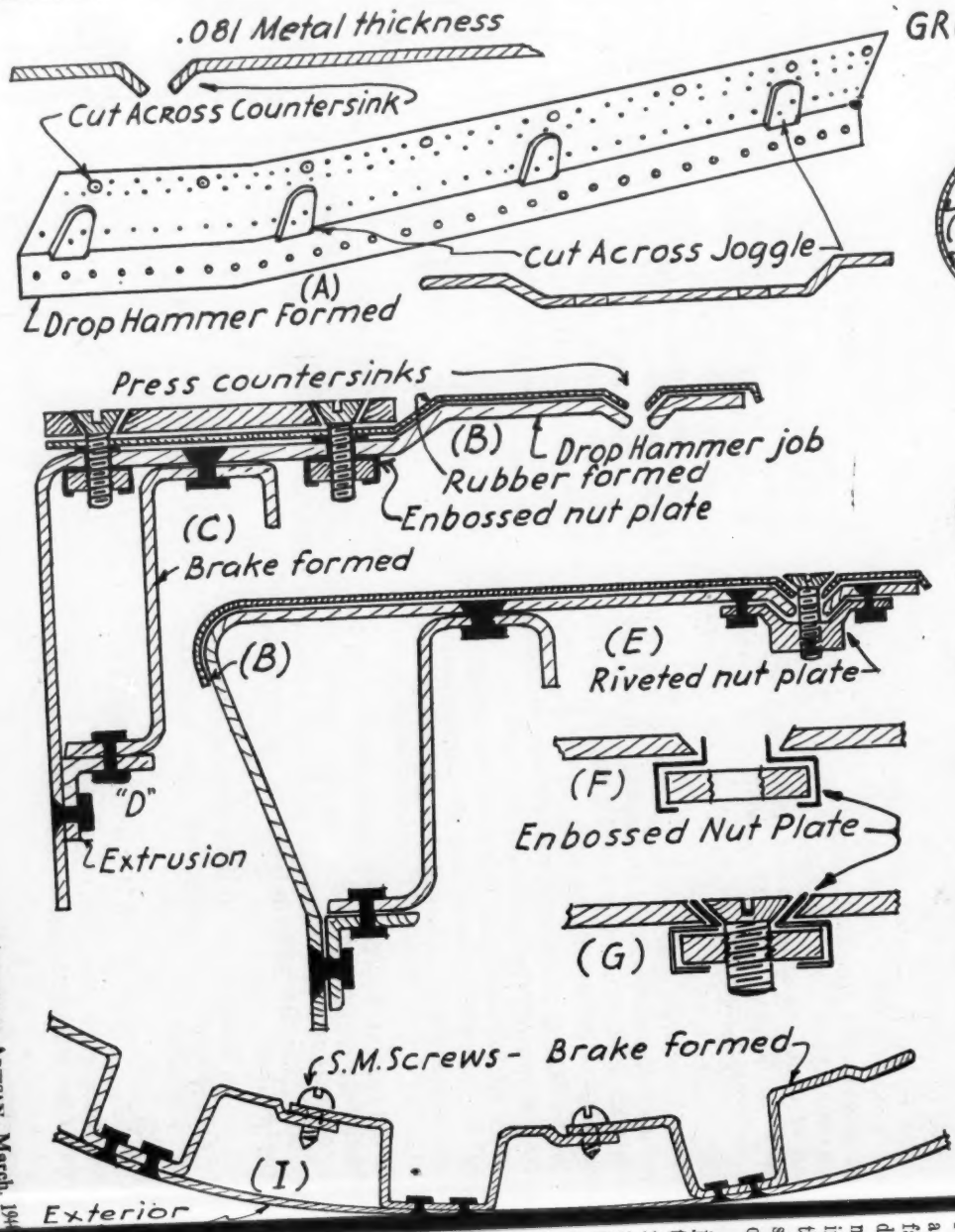
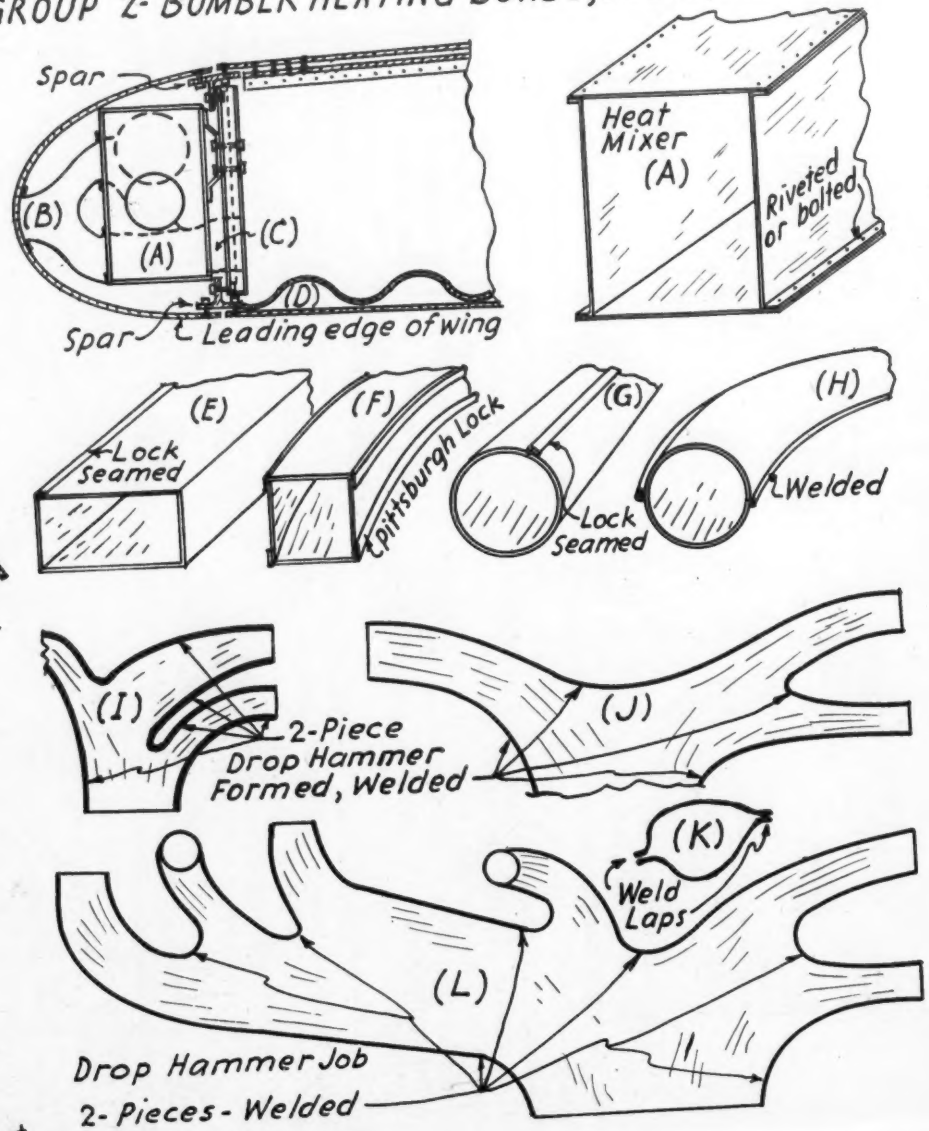


Fig. 15—Electrode used in gradient tests.

GROUP 1 - FABRICATING PROCESSES AND MEANS



GROUP 2- BOMBER HEATING BOXES, DUCTS, MANIFOLDS



Temporary Dies and Fixtures

(Hydro Press, Drop Hammer, Punch Press)

By Ernest E. Zideck
Sheet Metal Consulting Engineer

IN continuation of the discussion of the Hydro Press, the Drop Hammer and the Router jobs illustrated and described in the February issue of the AMERICAN ARTISAN, we present in this installment, under Group One of Drawings, certain specific jobs, which may be classed as typical, for the three means by which sheet metal formatures are accomplished in this class of work. The letter (A) of the drawings indicates an Access Door Sill, made of .081 thick aluminum. Were it not for the sill being streamlined with the contour of the hull of the ship, its formation could be accomplished in the press brake, putting in the 15 degree "knee" afterwards and doing the joggling in the punch press, one by one. But the 2-inch wide downward flange is a part of the general "mold" of the fuselage, and although the radius in the flange is less than ¾ inch over the entire length of the part, the radial formation precludes its being done in the press brake. On the other hand, it is not a job for the hydro-press because, even if the .081 thick metal would assume the form, it still would have to be reformed by hand over the block, and the joggles would remain to be done individually on the punch press. Formation of the sill in the drop hammer necessitates a dozen contour templates to be made by which to fashion the plaster cast serving for the mold for the drop hammer form itself, but once we employ the means, we receive the part formed to the desired shape inclusive of the joggles and the 8 countersinks. For the drop hammer operation the metal is sheared oversize, the surplus stock being bandsawed and shaved off afterwards.

As seen under the letter (A) of the drawings, the joggles in the above sill are made to receive 5/32-inch thick lugs, countersunk and bolted to "nut plates" fastened to the sill. It will be noted (B) that the two nut plates holding the lugs are of the newer, "enbossing" type, while the nut plates under the press countersunks (E) in the sill are the older, riveted type. The newer type of the nut plate consists of a die-pressed stainless steel nut holder (shown under the letter (F)), with the tube-like ends pressed over the nut. The nut itself is provided with grooves in its bottom side, the metal bent over it pressed into the grooves preventing the nut from turning. The upper ends of the tube are inserted through the hole drilled in the metal to which the nut is to fasten, with the tube ends bent over the metal (as shown under (A), or bent out to fit into the countersink, as shown in (F)). The portion of the tube forming the "boss" holds the nut in position.

The letter (B) marks a stainless steel plate fitting over the sill. This plate extends over the rounded portion of the sill, but is notched out in the joggled (recessed) portions of it, as shown in the picture with the lugs. This plate (B) fastens to the sill through the 8 press-countersunk holes and is held in the frontal portion of the sill by the partial "hooking-over" over the rounded portion of the sill and by the lugs bolted through it. The plate (B) is bent in its rear portion to cover the .081-inch thick edge of the sill. Again, were it not for the "mold" line of the ship, which must be maintained by (B), the plate could be formed in the press brake and joggled and countersunk afterwards. The plate being light gauge, half-soft stainless steel, the hydro-press will form it, especially will it form the frontal radial bend, but it will only slightly impress the joggles and the countersinks. These it is necessary to complete by special dies in the punch press.

A typical press brake job is the multiple angular form shown under (C). Here the "mold line" contour may be accomplished by two pieces of plywood held over the part, the wood flush with the flanges, and the so protected angles may be put into the rolls, the slight radial formature not marring them. The letter (D) shows the two parts, sill and angle, riveted to an extruded part, the rivets through the metal of the sill countersunk to present a smooth surface for the "skin" that reaches up to the end of the rounded portion of plate (B). Another typical press brake job are the stringers depicted in (G). These reinforcements, too, must follow the contour of the skin, and the aforesaid method of using woodstrips protecting the part in the rolls has been found to work well. Stringers, where not extrusions, are formed in the press brake and "molded" either by special rolls or, in absence of such rolls, in the above described manner, using flexible wood strips for protection.

In viewing the alignment of parts depicted under Group 1, and then reading the text pertaining to the best processes and means for their fabrication, we should not lose sight of the fact that, ninety per cent of sheet metal work in plane building is still what we call "fabricating." That means that there are no expensive or permanent dies employed, and that, such imposing machines as the Hydro Press, the Drop Hammer and the Router notwithstanding, the processes are far from standard. Aside from the practicability of doing a job by a certain means in a certain manner, the planning engineer must also consider the feasibility of doing the work by other means, employing the other machines and giving work to all the groups of workmen. Thus it happens often that the hydro press is employed doing work which could be done on the brake or, plenty of work which could be accomplished by inexpensive means in the punch press, being left for the personnel manning the drill presses and the work benches.

Bomber Heating Boxes, Ducts, Manifolds

In the January issue of the AMERICAN ARTISAN we have shown and discussed the *heating* of a Bomber. Under Group 2, of this issue, we show the principal constructions of the heating accessories. Under (A) is shown the "heat mixer" located in the "leading

edge" of the wing. This is a simple construction of plates, provided with flanges, riveted or bolted together. The air inlet (B) is definitively a drop hammer job, the two halves of the part welded together. The letter (K) item shows laps, left on the part in trimming, on which welding is done. As explained in the former article dealing with the subject, the air intake through the wing is governable by a series of movable baffles, the air being admitted to mix with the heat from the supercharger, or guided through the box into the wing itself, as shown by (C). In this connection we also show the principal construction of the wing, the two "spars" connected by the "web" and the "stiffeners," and the bottom portion of the wing reinforced by corrugations.

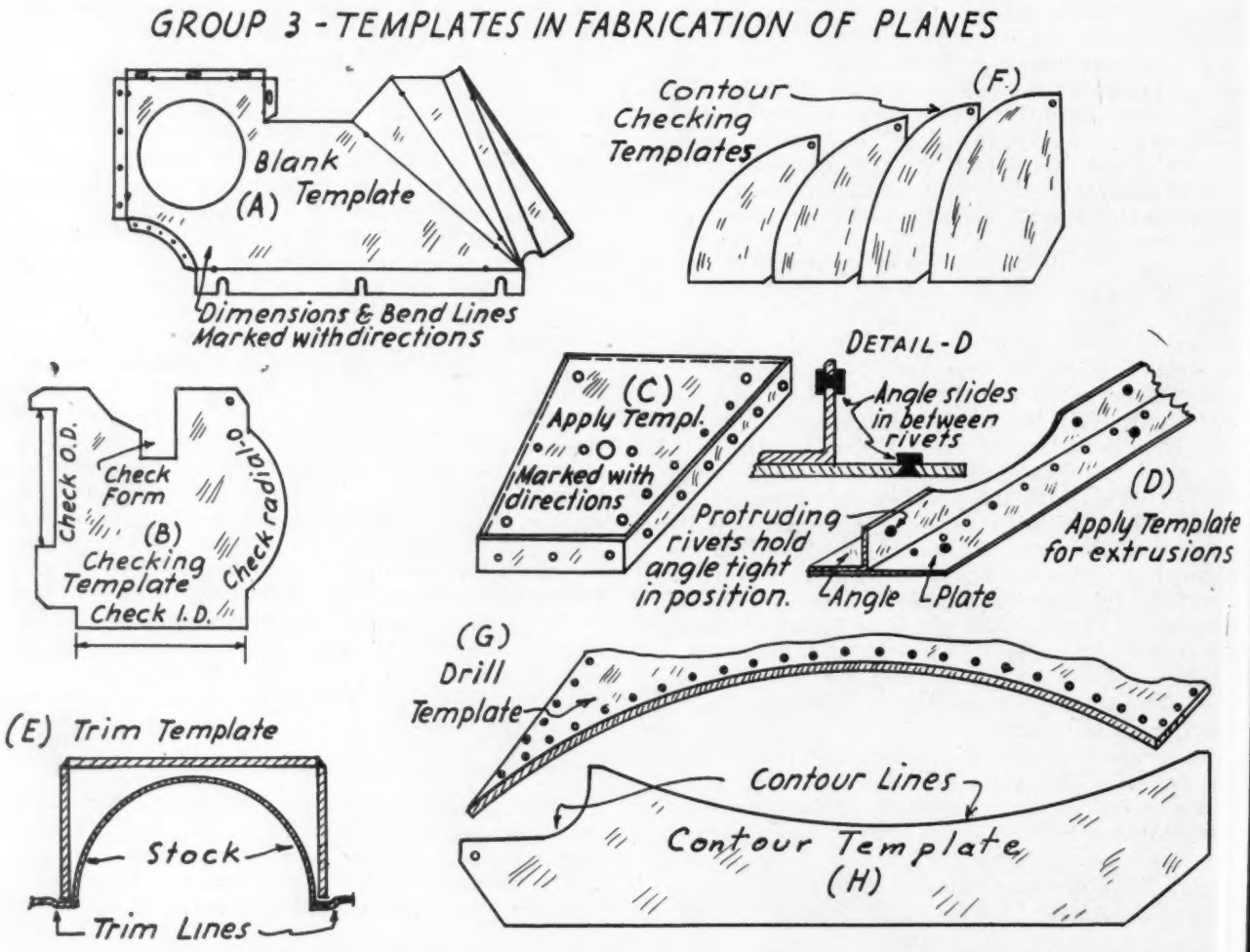
The great array of ducts which the heating of the Bomber requires might be reduced to four principal constructions, shown under E, F, G, and H. Straight ducts shown in E and G are *lockseamed.* Angular shapes with circular lines, elbows, offsets, branches and such like may be Pittsburgh-locked, as shown under the letter (F). But everything that is round or oval or elongated or changes from round to other shapes must be made of two halves, welded. The formation of the "halves" may be done in a few cases in the rubber, but the majority of such jobs will be destined to the drop hammer. The letters I, J, K and L mark several typical constructions formed in the drop hammer. The section shown under (K) shows the accepted mode of joining the two halves. This mode provides for "weld laps" which, in the process of welding, are joined tight, the weld penetrating to the inside of the tube and filling in the space between the radials of bends of the metal. The laps guard against the metal deforming under heat, or holes being burned in it, with the weld flowing to the inside of the tube and obstructing the air flow through it.

The drop hammer operation requires much preliminary work to be done. First, two sets of "templates" must be provided by which to fashion the *plaster cast.* After we have the plaster cast we use it for the moulding of the casting which then is finished into the drop hammer dies. Usually a "trim template" is used marking off surplus stock to be bandsawed and shaved off. Similar procedure of contour templates for the making of the form and trimming after formation applies to the Hydro Press work in these cases.

Group 3, Templates

In the foregoing text we mentioned templates being used for the fashioning of forms for the hydro-press and the drop hammer. A great number of individual templates is required in the making of such forms. Where the contours of the parts differ widely, as many as two dozen of larger and smaller templates are used on one single form block or drop hammer die. In addition to these formation-determining templates, which compare in their array to the series of Checking Templates shown under (F), the Fabricator of Aircraft must provide the following:

1—Blank Templates
2—Master Templates
3—Contour Templates
4—Checking Templates



5—Router Templates
6—Shaper Templates
7—Apply Templates
8—Trim Templates
9—Drill Templates
10—Rough Blanking Templates
11—Jig Work Templates

Under the letter (A) is depicted the principal template, called various names, but being what, in the sheet metal shop, was known under the name of "developed blank" or, "pattern." The developed blank template is used in the fabrication of every part, large and small. It is an exact pattern of what the correct blank should be to result in the specified dimensions and provisions in the part. The "blank template" is made even if not used directly in the work. It is used in these instances to "check" the other templates. It has stenciled in the metal of which it is made (usually sixteen gauge cold rolled, smooth steel), the necessary information covering dimensions, form lines, degrees of radiuses in the bends, sizes of holes of which the location is indicated by small, countersunk holes (not over 3/64 dia.), cutouts, notches, the minutest of pertinent details. In some cases the Blank Template contains also directions as to the "sequence" of operations.

The "master template" is a replica of the shop template. It is kept under lock and key and is used only for checking the shop template which may, under work conditions, lose its original correctness.

The letter (B) in the drawings of Group 3 indicates a "checking template." Its upper cutout checks the formation of the part in that certain detail. The left hand cutout checks the outside dimension of a formed or flanged part. The right hand radial checks the contour of a given portion of the part. And the bottom protrusion checks the inside of a formature. These checking templates are carefully made, duplicates being furnished the inspectors.

The third template shown, marked (C), is called "apply template," because it applies to a formed part. It is used mostly to mark cutouts and holes in the completed part. It is also used as a "drill template," the holes provided in this manner being more accurately placed than if provided in the unfolded blank. At the right in the drawing we see an "apply template" fashioned for angles and extrusions. The Detail D shows the construction, an angle spotwelded or riveted to a plate, the opposite side being used because it admits the sharp corner of the extruded part. For holding the part tight within the template a series of rivets are drawn through the metal, the formed heads of the rivets filed to dimensions admitting the part to slide between.

Under (E) is shown a "trim template" as might be used for trimming the one half of the drop hammer formed pipe. Under (F) is a series of contour checking templates, and (H) checks contours as shown. The letter (G), finally, indicates a "drill template" of which a number are used, especially for drilling bolt holes receiving "nut plates" to which fasten doors over gas tanks in the wings. Similar drill plates are used for drilling holes in the hull of the plane where access doors, manholes and such other apertures are provided and covered with removable plates.

It is said that "knowing the means for doing a certain job" is half of the task done. This is true especially in Plane Sheet Metal Work. First of all, the importance of "templates" can not be overstressed in this work. Without the templates, especially the Blank Template, the shop could not perform. And without the other templates no systematic and efficient job could be done. Thus, in every air craft plant a large force of men (lately women, too), is busy doing nothing but template work. The work is done from the engineering drawings, but many details must be gotten from the "Loft" (the Composite Layout of the Plane Hull, Wings, etc.). Many former tool and machine shops are busy subcontracting for the making of templates exclusively.

URCA Convention Shatters Records

The United Roofing Contractors Association held their 57th Annual Convention at the LaSalle Hotel, Chicago, on January 25th and 26th, with limited luncheon guarantees to 150 at each session and 200 at the banquet. Registrations were stopped at 260 when the hotel management stated that food supplies had run out and there was not sufficient help to prepare additional meals.

The U. R. C. A. Board of Directors met at the hotel on Monday, January 24th, with 21 of the 26 directors in attendance—hailing from Kansas, Illinois, Indiana, New York, Kentucky, Nebraska, Wisconsin, Utah, Missouri, South Carolina, Colorado, Ohio and Pennsylvania.

The opening session was addressed by L. M. Cassidy, vice president in charge of building materials, Johns-Manville Sales Corporation, who made a penetrating analysis of present and future trends in construction and its influence upon industry products. A feature of his address was a number of suggestions for the elimination of unethical applicators or roofing and siding products, in which he asked manufacturers to be more careful in their selection of dealers, jobbers to forego immediate profits by similar care in the choice of accounts, and contractors to do a better selling job.

James J. Zourek, of the Material Service Corporation of Chicago, initiated a discussion of the jobbers' position in the distribution of roofing materials. He made a surprise announcement of the formation of the National Roofing Jobbers' Association. The new national association is the answer to a need for the pooling of interests in the roofing jobbing field, a section of the industry which has expanded enormously in the past twenty years. Mr. Zourek announced that the National Roofing Jobbers' Association would hold their first annual convention in 1945 on the same dates and in cooperation with the U. R. C. A.

A new constitution and by-laws of the national association was presented to the convention and unanimously adopted. It called for among other things an increase of annual dues from $10.00 to $25.00, and three additional types of memberships—ten year memberships at $150.00, sustaining memberships open to manufacturers, jobbers and supply firms at an annual contribution of $150.00 and honorary memberships to be awarded by the U. R. C. A. for distinguished service to the roofing industry.

Vice President and later President Art Biebel made an impassioned plea for contractors to swell the membership of the association and in particular to take up ten year memberships. Thirteen took him up on the offer.

James McCawley, Executive Secretary of the U. R. C. A., followed with a report on the association work for the past year in which was featured aid given by the U. R. C. A. to industry members, manufacturers, jobbers, property owners and one foreign government—the Soviet Government, emphasizing the success of the U. R. C. A. in getting the WPB to amend its regulations in response to complaints of members.

At the Wednesday session W. B. Alexander, Director

(*Continued on page* 108)

The Three Fundamental Fan Laws

No. 1-(First Power) Air Volume
No. 2-(Square) Air Pressure
No. 3-(Cube) Fan Horsepower

By H. M. Nichols
Manager, Dust Control Dept.
B. F. Sturtevant Co.

AN understanding of the fundamental laws governing the performance of centrifugal fans is one of the most useful bits of knowledge that one having fan problems to solve, can possess.

The most important of these fundamental fan laws, are three in number and can easily be remembered by thinking of them as the 1, 2, 3 laws, or first power, square and cube laws. These three laws state what happens to the air volume, pressure, and horsepower of a fan, operating on a given system, *when the fan speed is changed,* and all other conditions remain unchanged. Under such conditions, the following relations occur:

Fan Laws

(1) Air volume is directly proportional to the fan speed or RPM.
(2) Pressure developed by the fan is directly proportional to the square of the speed $(RPM)^2$.
(3) Horsepower required to drive the fan is directly proportional to the cube of the speed $(RPM)^3$.

For these laws to apply, the piping, hoods, dust collector, filters or other component parts of the fan system, which create the resistance against which the fan operates, must remain unchanged. Also these laws apply when a fan is operated without resistance, i.e., with inlet and outlet wide open to the atmosphere. These laws also apply through all ranges of speed. This is due to the low density of air, compared to water and, consequently, there is no cavitation effect such as occurs with centrifugal pumps.

Algebraic Expression of Fan Laws

These fan laws may be expressed algebraically as follows:

$$(1)\quad q = Q\left[\frac{s}{S}\right]$$

$$(2)\quad p = P\left[\frac{s}{S}\right]^2$$

$$(3)\quad h = H\left[\frac{s}{S}\right]^3$$

$$(4)\quad s = S\left[\frac{q}{Q}\right]$$

$$(5)\quad s = S\sqrt{\frac{p}{P}}$$

$$(6)\quad s = S\sqrt[3]{\frac{h}{H}}$$

Where:

S = Original Speed
s = New Speed
Q = Original Volume
q = New Volume
P = Original Pressure
p = New Pressure
H = Original Power
h = New Power

Typical Problems Involving Fan Laws

Among the many problems that can be solved by these equations, a common one is the determination of correction for low pressure, it being required to determine what change in speed and horsepower will produce the desired pressure.

A typical problem would be an exhaust system taking dust from grinding wheels in the State of New York, where code specifies 2 inches suction at the throat of the hoods.

We will assume suction obtained is 1.8 inch, fan speed 1,000 RPM, and fan horsepower is 12.

Since all pressures will change equally, it will be necessary to increase the fan pressure by the ratio of 2 to 1.8.

Substituting in equations (5) and (3) where P = 1.8 and p = 2.

$$\text{New speed (s)} = 1000\sqrt{\frac{2}{1.8}} = 1053.$$

$$\text{New horse power (h)} = 12\left[\frac{1053}{1000}\right]^3 = 14$$

Another common problem would be a warm air heating system with fan delivering 10,000 CFM at fan speed of 900 RPM and 5 fan horsepower. It being required to increase the air volume by 10% to 11,000 CFM.

Substituting in equation (4) for new speed.

$$s = 900\left[\frac{11{,}000}{10{,}000}\right] = 990$$

Substituting in equation (3) for new power.

$$h = 5\left[\frac{990}{900}\right]^3 = 6.7$$

A third type of problem is one where the motor is underloaded and it is desired to increase the air delivery and fan speed to use the full load capacity of the motor or it may be that the motor is overloaded and it is required to reduce the air volume and speed to take rated horse power. These and many similar problems are easily solved by substituting in suitable equations (1) to (6).

Extension of Fan Performance Tables

Still another use of these fan laws is in the extension and interpolation of fan performance tables, since many times the fan performance tables available do not cover the performance range desired.

If the fan tables do not contain data for the desired speed, take data from tables at the nearest speed and obtain exact performance data by substituting in equations (1) to (3).

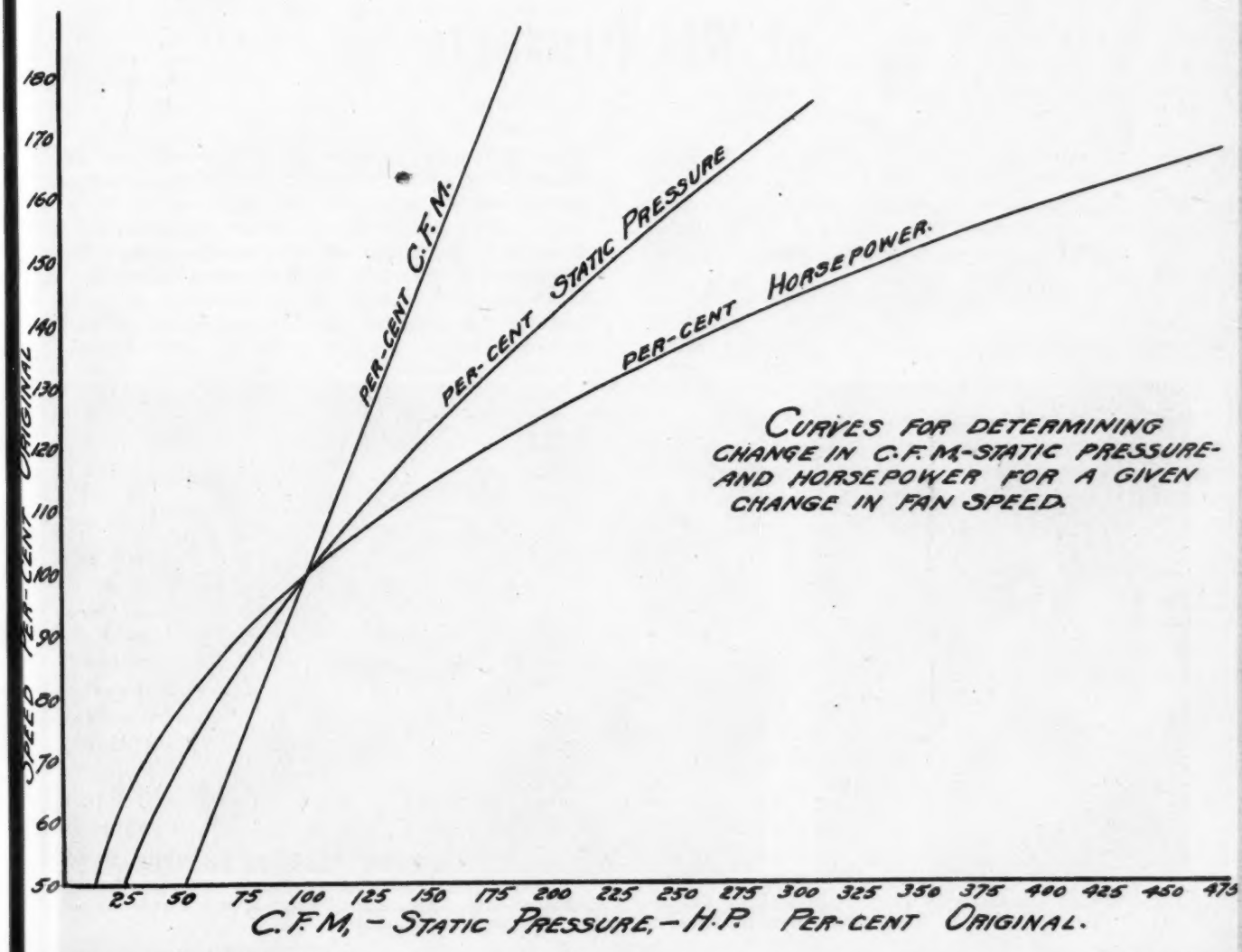
This procedure is useful in constructing fan performance curves from table data.

Where the pressure ranges higher than the table it is convenient to refer to the table at ¼ the pressure ½ the volume and ½ the speed. Multiplying the table speed and volume by 2, table pressure by 4 and table power by 8, will give the desired operating conditions.

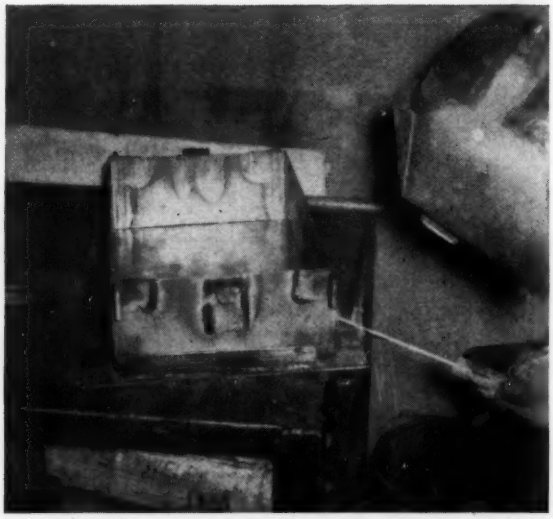
Curves for Solution of Fan Problems

For convenience in solving the various types of problems involving these fan laws, the accompanying curves have been prepared showing per-

(*Continued on page* 96)



CURVES FOR DETERMINING CHANGE IN C.F.M.-STATIC PRESSURE-AND HORSEPOWER FOR A GIVEN CHANGE IN FAN SPEED.



Left—U. S. Employment Service trained girl welder, with Feiner post-graduate instruction, gas-welds corners of a tank battery box. Stiffness of 13-gauge metal eliminates need for fixture. Right—Another girl operator welds supporting lugs on carrier. A special fixture holds all lugs in position.

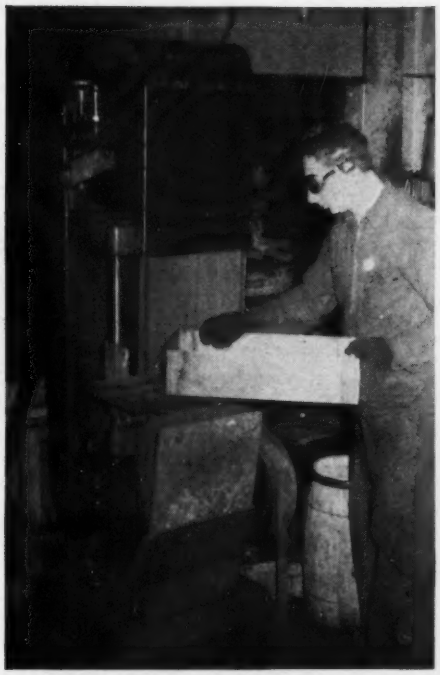
Womanpower, Plus Modern Equipment, Enables Feiner to Maintain Large Volume Production of War Products

ONE OF the busiest plants in war work, in the metropolitan New York area, is P. Feiner and Sons, Inc., where, in the last two years, a very wide variety of products has been contracted and completed to the complete satisfaction of numerous prime contractors.

A large and well equipped plant pre-war, the volume and variety of war work under way today has necessitated the construction of an additional factory building and the installation of numerous new machines which speed-up production by doing rapidly one special job.

So lengthy and varied is the list of products produced by Feiner in the last two years that even a brief tabulation is impossible, but two items were selected early last fall to show Feiner methods and typify some of the problems war production has posed for the organization.

Left—Woman operator spot welds hardware on spare parts box. Right—Same operation, closeup, showing simple template which positions hardware on box and insures exact alignment.



Left—Large, modern, high speed belt grinder removes all excess weld metal in seconds and touches up corners of battery carrier in a fraction of the time required with flexible shaft wheels. Right—High speed carborundum saw (another Feiner new machine) whisks through light structural shapes. Here wheel is cutting carrier lugs.

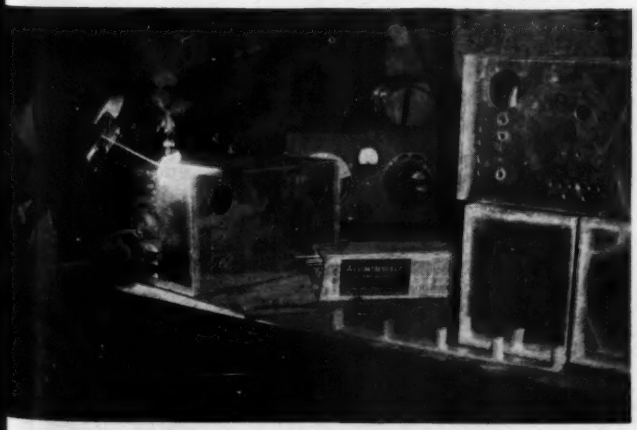
Tank Battery Carrier

Feiner always was and now is particularly well equipped to handle work in heavier gauge and in light structural shapes. One of the items selected for photographing was a battery carrier for tanks and similar self-propelled combat vehicles. This box is 13-gauge black plate—not very large and not very complicated, but held to fairly close tolerances by installation limitations.

Four photographs show interesting Feiner methods in fabricating this carrier. The shallow box is made from one piece of metal—the plate is sheared to size, the corners are notched and the two ends and two sides are turned up 90 degrees in the press brake using customary methods. The next operation requires the four corners to be gas welded. No special fixture is needed because the material is stiff enough to be self supporting and aligning.

One interesting phase of this welding is the welders. The photograph of a corner being welded shows that the operator is a girl. One of the real problems was manpower, to solve which Feiner decided that his older men mechanics would be placed on operations where experience was useful or where some handling of heavy parts was required. Welding was a fringe case—welding required skill (not necessarily experience), but operations could be arranged so that handling of material was done for the welders, if necessary.

So welding was determined a woman's operation. Where to get women welders was solved by applying to the U. S. Employment Service for graduates from their women's welding school. Feiner then arranged to give selected women additional training under a skilled mechanic, until the operator was considered able to carry on alone. The result has been satisfactory.



Aluminum communications cabinets die-formed, provisioned and welded to exact specifications. Feiner can do very light to very heavy gauge work.

Women Show Remarkable Aptitude

On this question of women in sheet metal plants, Feiner reports that he has had as many as six women on one shift. They learn readily, and with shop training in addition to previous schooling or training, they can satisfactorily weld, operate shears, punch presses, have even used the press brake on light pieces. But under New York state laws, women may not operate grinding machines.

An interesting example of operating a woman can do surprisingly well is related by Feiner—one operation called for tapping a blind hole with a bottoming tap. A girl raised the production to 400 tapped holes a day and didn't break a tap. Another girl tapped more than 250 holes (.022) without breaking a tap, whereas former men used to break a tap every 25 to 50 holes.

After the corners are welded the welds are smoothed by another special machine—a large high-speed belt "sander" which takes weld metal down in a few seconds.

Unusual 18-gauge black iron materials storage bin made by Feiner for an industrial customer who wanted these bins hung around a building column.

A battery box is made into a carrier by welding to the box several lugs made from flat bar stock. To speed up cutting the strip into lug length, Feiner installed a high-speed caborundum wheel which "walks through" the stock almost as fast as the machine can feed. The short lengths are then formed to lug shape in the brake or punch press and lugs and box are placed in a welding fixture (see photograph) and are welded together. The carrier is then complete excepting for inspecting and dressing up rough welds.

Spare Parts Box

Of lighter gauge (20 gauge) the spare parts box shown in two photographs is assembled from four pieces, plus hardware. The bottom, front and back are one-piece flanged to take the two ends which are spot welded, as shown, inside the flanges. The top is one piece, properly stiffened by folds.

Hardware consists of two hinges, a handle, handle clamps, hinged hasp, all spot welded in position. To speed spot welding and to keep the hardware in exact position during welding, two simple templates were prepared—one holds handle clamps and hinges in position on the cover; the other holds hinges in place on the box. This spot welding of hardware is another operation handled by women as pictured.

Pre-War Work

The Feiner company is finding that its pre-war work in both heavy and light gauge materials has been varied enough and to such close tolerances that the transition to war work was not difficult. Equipment was such that conversion was readily made; its working staff was familiar with fabricating requirements. To illustrate this point, two photographs show pre-war or early war work. The storage bin of 18-gauge black iron, requiring semi-circular back, bottom and top with welded-in partitions and made to fit around a supporting column is not much different, fabrication-wise, from the battery boxes. The instrument panels of ⅛-inch aluminum, welded, was precision work—including die forming and provisioning and is comparable to some of the war items now going through the plant.

The chief differences, to reiterate the point made previously, is that where before Feiner's trained and experienced mechanics were used, today less skilled men and women must be employed. Feiner believes that by sifting women to find the best trained, plus training in the shop on actual operations under competent mechanics this handicap imposed by war conditions can be overcome and production maintained at a high level. Whether women will continue to be used will depend on future availability of mechanics and the type of work plants like Feiner's will contract post-war.

Michigan State College 13th Forced Air Conference

The program of the 13th annual Forced Warm Air Conference to be held at Michigan State College, East Lansing, Michigan, as set up follows:

Monday, March 21

9-10 A.M.—Registration.
10-11 A.M.—Heat Loss Through Building Construction.
Robert Champlin, Timken Silent Automatic Co.
11-12 A.M.—Human Comfort as Affected by Building Construction.
J. B. Wallace, International Heater Company.
12:30 A.M.—Lunch.
1:15 P.M.—Presentation of the Design Problem.
Calculation of Heat Loss by Conduction.
J. Earle Maynard, Rybolt Heater Company.
4:00 P.M.—Infiltration and Its Effect Upon Comfort.
Calculation of Heat Loss by Infiltration.
Guy Voorhees, Hall-Neale Company.
6:00 P.M.—Dinner.
7:30 P.M.—Round Table Discussion. Desirable and Allowable Register Temperature Number of Recirculations, Rise in Temperature Through the Unit. Determine Register Temperature for Problem.
Guy Voorhees.
Fred Bishop, Brundage Co.
Ed Root, Superior Safety Furnace Pipe Company.

Tuesday, March 22

9:00 A.M.—CFM Requirements, CFM Factor. Determination of Air Quantities for Each Room in the House.
Gil Denges, Williamson Heater Company.
11:00 A.M.—Location and Size of Grilles and Registers.
Robert Leigh, Air Control Device Company.
12:30 P.M.—Lunch.
1:30 P.M.—Friction Loss in Ducts and Fittings.
Layout and Design of Warm Air and Return Air Ducts.
Ross Wallis, Meyer Furnace Company.
6:30 P.M.—Dinner.
7:30 P.M.—Evening in the Laboratory—Prof. Jesse Campbell, M.S.C. Demonstration of the Fellows Smokeless Combustion Furnace as Manufactured by the Majestic Company.

Wednesday, March 23

9:00 A.M.—Design of a Gravity System for the Problem House.
Ed Root, Superior Safety Furnace Pipe Co.
12:30 P.M.—Lunch.
1:30 P.M.—Design of a Forced Warm Air System with New Manual.
S. Konzo, Special Research Professor, University of Illinois.
Comparison with Technical Code System.
Ross Wallis.
6:30 P.M.—Banquet—Combined Meeting Short Course and Western Michigan Chapter A. S. H. & V. E.
Chairman—Prof. Chas. Pesterfield, President Western Michigan Chapter.
Toastmaster—Webb Rybolt, Rybolt Heater Co.
Speakers—Geo. Boeddener, Managing Director, National Warm Air Heating and Air Conditioning Association. Harold Mueller, Mueller Furnace Co., President N.W.A.H. & A.C. Assn.
Lecture and Demonstration of Electrostatic Precipitation of Dust.
Arranged by J. L. Foley, Precipitation Specialist, Westinghouse Co.

Thursday, March 24

9:00 A.M.—Comparison of System Characteristics with Fan Characteristics.
Selection of Fan for Problem House.
Prof. C. H. Pesterfield, M.S.C.
10:30 A.M.—Design of a Filter System Small Home Heating Plant.
Frank Harbin, Home Furnace Co.
12:30 P.M.—Lunch.
1:30 P.M.—What a Control System Should Do for a Forced Warm Air System. A Comparison of Some of the Common Types of Controls.
J. W. Woodson, Detroit.
Question and Answer Period.
Adjournment.

Rooms and Meals will be available at reasonable cost but no definite announcement can be made.

All over the house there is work for you

MILLIONS of new houses, plenty of remodeling jobs, countless repairs and replacements — all of these will mean more business for sheet metal specialists.

Ductwork, roofing, siding, partitions and insulation, all sorts of alterations and improvements will mean greater demand for your craftsmanship and for the steels that have proved their worth in countless new wartime applications.

Wherever beauty, lightness, strength and durability are needed, there is work for the artisan who appreciates the additional advantages, the sort of resistance to fire, weather, abrasion, corrosion and impact—the wide range of workability—you get with U·S·S Steel Sheets.

Your improved shop methods, more skillful cutting, shaping and fabricating, improved welding technique and joint designs will enable you to do an outstanding job if you also recognize the unique characteristics of each type of steel, take full advantage of the demand for products made of U·S·S Steel Sheets.

Let us help to supply answers to your most pressing problems. Our technical staff will be glad to consult with you about your individual difficulties. Write for a free copy of the U·S·S Sheet Metal Worker's Guide. You incur no obligation.

U·S·S STEELS FOR SUCCESSFUL SHEET METAL WORKMANSHIP

U·S·S GALVANIZED STEEL for sheet metal structures requiring the added protection of a zinc coating.

U·S·S COPPER STEEL to give twice the atmospheric corrosion resistance of regular steel at little additional cost.

U·S·S PAINTBOND—A galvanized, Bonderized sheet that permits immediate painting and holds paint tighter. U·S·S Dul-Kote, a product with similar qualities, available in the South and West.

U·S·S HOT-ROLLED AND COLD-ROLLED STEEL to provide the basic advantages of steel, plus maximum economy, in accordance with the needs of each individual job.

U·S·S STAINLESS AND HEAT-RESISTING STEELS to assure high resistance to corrosion and heat, and to reduce weight.

U·S·S VITRENAMEL — Sheets designed especially for porcelain enameling.

U·S·S LOW-ALLOY, HIGH-STRENGTH STEELS to resist corrosion and increase strength-weight ratio.

U·S·S STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

USS

UNITED STATES STEEL

Wisconsin Ass'n, at 1944 Convention Takes A Long Look into Post-War

THE Sheet Metal Contractors Association of Wisconsin enjoyed a very active 1943, reported President Paul Krueger, in opening the 1944 convention in Milwaukee on February 7 and 8. District meetings, meetings of the Board of Directors, and meetings of local associations all enjoyed a good attendance and an expression of interest from members which was definitely encouraging to the officers of the associations. This active 1943, pointed out President Krueger, certainly was climaxed by the 1944 convention with almost 300 registrants.

Individual Income Tax

Opening the meeting with a discussion of "Your Income Tax Problems," G. J. Johnson, representing the Milwaukee Office of the Internal Revenue Bureau, passed out to the convention copies of Form 1040, Individual Income and Victory Tax Return, and invited members of the association to follow him item by item in filling out a typical income tax return. It would be impossible to report all the details of this income tax form, and since most readers are already wrestling with the return, this report will summarize Mr. Johnson's talk by stating that for the average man in business the individual income tax return necessitates a good bookkeeping system.

OFFICERS

President—A. C. Mantei of Milwaukee.
Vice Presidents:
1st—J. W. Birthrong of Waukesha.
2nd—H. J. Ortwig of Racine.
3rd—Howard Benning of Milwaukee.
4th—G. F. Wolff of Madison.
5th—Walter Marth of Milwaukee.
Treasurer—Frank Kramer of Milwaukee.
Secretary—Paul L. Biersach of Milwaukee.
Sergeant-at-Arms—W. G. Eberhardt of Racine.

Mr. Johnson warned employers to be sure to file the Form W-3 (see Arthur Roberts' article in the January American Artisan) which every employee working for the employer during all 1943 must file. The employer should also file his various W-2 reports and keep duplicates of these W-2's, giving the original to the employee. The contractor should also get from each employee a properly filled in Form W-4. The employer is not responsible for the information shown on the W-4, this is the responsibility of the employee. All of these reports were discussed in detail in the Roberts' article in the January American Artisan, and Mr. Johnson's discussion was quite comparable to the Roberts' article.

Mr. Johnson said employers would have to make a declaration tax return for 1944 income on March 10 of this year—this declaration will be an estimate of 1944 income, to the best of the employer's ability. For employers, one-fourth of the estimated 1944 income tax must be paid on March 10; one quarter on June 15, one quarter on September 14 and one quarter on December 15. If you underestimate on the return, you should increase the payment on the next quarterly return. Final adjustment and final declaration for 1944 income will be filed on March 15, 1945, at which time, adjustment and either additional tax or a refund will be reported by the employer.

Mr. Johnson answered a number of questions on earned income credit which is, he said, ten per cent of the net income up to $3,000 or for a man in business (an employer) is calculated as 20 per cent of the net income from the business and then ten per cent of that 20 per cent is earned income credit. This is not 30 per cent of net income.

Corporation Taxes

Speaking on "Corporation Income Tax Problems" William Thibodeau of the Milwaukee office of the Treasury Department said his subject was much too complicated to discuss in detail in general terms so each employer or man in business had best seek the advice of either a certified public accountant or a tax consultant. Accordingly, the speaker confined his remarks to some of the more general phases of the corporate income problem such as the difficulties of financing the war. The current war budget, said the speaker, approximates a hundred billion dollars, while our estimated annual income is around a hundred and forty billion dollars. It obviously is impossible to get all this hundred billions through direct taxation, so part of the money must be obtained through the sale of bonds. Because of this heavy national financial burden, the corporation income tax and the excess profits tax will bear heavily on many concerns, but is necessary, in the estimation of the treasury department.

With specific reference to corporation tax returns, Mr. Thibodeau warned that every corporation must file on the fifteenth of the third month following the end of the corporation's fiscal year the corporation tax report. He then cited certain tax rates and excess profits tax brackets and explained briefly some of the provisions for the carry-over and carry-back for a two-year period. (This carry-over and carry-back provision of the tax law was discussed by Arthur Roberts in the August, 1943, issue of American Artisan.)

The afternoon session was brought to a conclusion with the showing of a moving picture film, "Steel—Man's Servant," offered by the United States Steel Supply Company. This film was a beautiful presentation of steel's place in the war, in technicolor, showing many war uses of common and unusual steels, and vividly portraying the manufacturing processes from the iron ore to the finished product.

Postwar Heating

The subject of heating problems in the postwar period and a plan by which the heating contractor may

do some postwar planning was presented by J. D. Wilder, American Artisan. This discussion of a postwar plan for contractors is a part of a study of postwar planning as it affects the heating industry, and will be presented as a study in an early issue of AMERICAN ARTISAN.

Wisconsin Public Construction

Frances Lamb, representing the planning board for the State of Wisconsin, so far as postwar planning affects Wisconsin State construction, cited numerous examples of projects under discussion and contemplated for immediate construction as soon as materials are released and building restrictions relieved. Mr. Lamb emphasized that all of the many projects he itemized are essential work. In preparing this plan, the first problem was to time the spending so that the moneys expended would return the greatest possible benefit in terms of employment and would, at the same time, directly improve state facilities throughout Wisconsin.

The urgency part of this program contemplates the expenditure of about $12,000,000. $7,000,000 have been earmarked as "First Construction" and may be typified by the following: $500,000 for the Wisconsin General hospital; two million dollars for the State asylum; $1,800,000 for another state institution; two and one-half million for a feeble minded institute. On the more general postwar plan, the following items are typical—$700,000 for a feeble minded hospital; $500,000 for the criminally insane institution; one million dollars for state prison; $400,000 for a women's prison; $115,000 for a boys' reformatory; $600,000 for a blind institution; four million dollars to be spent in nine state normal schools; eight million dollars to be spent by the University of Wisconsin, etc.

Mr. Lamb pointed out that these projects are scattered widely around the state; are all badly needed; and in terms of materials and labor should contribute materially to any postwar construction program which may be used to fill in gaps while business is resuming its normal construction volume.

Postwar Problems

R. H. Warmlee, Minneapolis-Honeywell Company, listed three major problems confronting American business now and in the postwar period. These are (1) winning the war; (2) problems of civilian morale and inflation; (3) postwar planning in general.

On postwar planning in general, Mr. Warmlee suggested that the pessimists have forecast a period in which we may go back to grandma's spinning wheel with farming taught in every school. The optimists, on the other hand, hope there will arise in America, in the postwar period, men of courage who will fight for our established American way of life. Many pessimists also fear that industry in America can not insure prosperity of the volume we anticipate and that, therefore, eventually, government will have to step in and take over in order that the world's greatest depression does not occur in the United States in the postwar era.

It is a challenge to American business, both large and small, to avoid this pitfall and these dire possibilities. But to do so, American business men and industry must provide jobs for at least 55,000,000 employees—this is more than America has ever employed in a normal peacetime year. Business will also have to insure at least 165 billions of gross national income, based upon 1942 price and wage levels. This also far exceeds any annual national income the country has ever enjoyed in peacetime.

Said Mr. Warmlee—only research, courage, and the will to do can insure this employment and income level and only as we keep government out of business so far as possible can we be reasonably sure that business will be given the necessary opportunities to undertake this tremendous task.

So far as the building industry is concerned in this proposed postwar national employment and wage level, the building industry will have to do 200 per cent more dollar volume of work than ever before in a peacetime year. And of this muchly enlarged building program, heating will have to do at least 88 per cent more dollar volume than it did in 1940—which was a pretty good heating year.

Of this required increase, small business must carry its share and small business, representing firms employing fewer than eight men must insure employment of at least 80 per cent of the 55,000,000 workers. It will mean that every little business, no matter how small, must have plans and courage and must be embued with the spirit to do or else postwar we will have depression.

Mr. Warmlee pointed out a fallacy in some current advertising which claims labor is the basis for all American business and American prosperity. Mr. Warmlee said not labor, but "tools" are the facilities which insure American prosperity. Labor, strictly as such, is more than abundant in China and in India, yet these two countries do not enjoy prosperity as we visualize prosperity in America. It has been, it is, and it will be "tools" which insure a standard of living at the American level.

So far as postwar planning is concerned, the speaker pointed out that the real problem is to get our tremendous potential production of consumer goods to the consumers. Now is not too early for every business, either large or small, to lay postwar plans. In our own heating industry, our challenge, postwar, will be to see that an appreciable percentage of the building dollar is given over to better heating and better homes rather than to more elaborate automobiles, super-duper radios, etc. When homes are built, pointed out Mr. Warmlee, the whole community prospers because men are employed, materials are used, transportation must be employed, retail establishments reflect the income and spending, even the professional class benefits because of more money circulating in the community. This is not true, in the same measure, when moneys are spent for luxury goods produced in distant communities.

Finally, the speaker emphasized that the ability to sell—perhaps better defined as the ability to create a desire for more and better products in the minds of consumers, has been the "tool" which has made America great and prosperous. The heating system sold postwar, then, should be of such quality and of such advanced design, that there will be created by advertising and selling a desire on the part of more and more home owners to possess the best possible type of heating system. To firmly establish this better heating comfort is one of the large tasks confronting our industry. It can be done, it is in the planning stage now, and if every man in the heating business contributes his share, it will be assured postwar, concluded Mr. Warmlee.

Entertainment

No report of a Wisconsin convention during the

(*Continued on page* 108)

ASSOCIATION Activities

New York State

The two-day program of the New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association convention to be held Wednesday, March 29, and Thursday, March 30, at the Ten Eyck Hotel, Albany, is set up as follows:

Wednesday, March 29

"Report on our Group Compensation"
By our Group Managers, Laverack & Haines, Inc.
Noonday Luncheon with Architects and Builders
"Post War Public Works Planning in New York State"
Holden A. Evans, Jr., Executive Secretary, New York State Post War Public Works Planning Commission
"Copper and Its Use in the Post War Period"
By Max Walten of the Copper & Brass Research Association
"Slate & Tile Roofing"
By our well known commentator, George Ballard
"What to Expect in Furnace Supply for 1944"
By George Boeddener, Managing Director of the National Warm Air Heating and Air Conditioning Association
Evening "Open House"
Courtesy of the Merchandisers Association and showing of the film "Men, Metals and Machines"
By the International Nickel Company

Thursday, March 30

"Welding Demonstration"
By the Lincoln Electric Company of Cleveland
Nomination and Election of Officers for 1944 and Business Meeting of the State Association.

Valuable technical books will be given away at each session. Members are urged to make their reservations, and to solicit advertising and help make the convention a success.

Clarence J. Meyer, State Secretary.

◆

Illinois

At the Board of Directors Meeting of the Sheet Metal Contractors Association of Illinois, held February 10, 1944, at the Jefferson Hotel, Peoria, the following officers and directors were present:

Edward M. Pluth, President, Lincoln
C. L. Lauerman, Vice-President, Galesburg
Frank Eynatten, Treasurer, Peoria
W. R. Shaw, Secretary, Jacksonville
Erwin Eichenberger, Director, Peoria
Joe J. Walters, Director, Ottawa.

Plans were made for the 1944 convention to be held at the Jefferson Hotel, Peoria, on April 12 and 13. On the night of April 12, there will be a special stag for men and a special program for the ladies—bring them along.

A program will be mailed to all sheet metal men in the state. A non-ration buffet lunch (banquet) will be held on April 13 for men and women.

Erwin Eichenberger is on the program committee.

Special speakers will be worth the trip to hear. Also you will hear plenty about the new National association.

W. R. Shaw, Secretary.

◆

Florida

The February 15 issue of The Florida Roofer is accompanied by a return postal for suggestions as to date for the 1944 convention of The Roofing & Sheet Metal Contractors Association of Florida. Also inclosed is a letter addressed to members and associate members advising that the officers propose to hold the annual convention on the 12th and 13th of May or the 19th and 20th of May at the Suwanee Hotel, St. Petersburg, and asking suggestions for speakers, motion pictures, etc.

L. A. Burgess, Secretary,
915 N. Poinsettia Avenue, West Palm Beach.

Sheet Metal Contractors' National

The dates for the Sheet Metal Contractors' National Association, Inc., National Convention have been definitely set as April 27-28 at the LaSalle Hotel, Chicago, Illinois.

CLARENCE J. MEYER, *National Secretary.*

◆

Fan Manufacturers 27th Annual

At the twenty-seventh annual meeting of the National Association of Fan Manufacturers held in Detroit on January 19, 1944, the following officers were elected for the ensuing year: C. T. Morse, President; J. M. Frank, Vice-President; and L. O. Monroe, Secretary-Treasurer.

Fans and blowers of all member companies are manufactured exclusively for the war program. These products are used in systems for heating, ventilating, drying, cooling, mechanical draft for boilers in power plants, and in other industrial process work.

◆

Kansas City, Mo.

The Sheet Metal and Heating Contractors Association of Kansas City, Missouri, is interested in a city code, and hopes to gain the cooperation of wholesalers in selling only to established licensed concerns.

At present they have obtained copies of various codes used in other large cities. After studying and discussing these they expect to be able to draw up a strong, workable code with ample provisions for its enforcement. In this way they hope to gain protection for their members and for the citizens of Kansas City.

Any suggestions or added literature on the subject would be welcome.

Leo E. Coffey, 3801 Woodland, Business Manager.

◆

Institute—Chicago

The Furnace, Air Conditioning & Sheet Metal Institute of Chicago, met on December 17th at Hub Hall, with Francis Schnell—the first Institute member to get into service—as the honored guest.

John Spitzer, president of the Central Committee, installed the following officers:

President—John Novak.
Vice President—Marvin Lawrentz.
Recording Secretary—R. L. Tippet.
Financial Secretary—Louis Drehobl.
Directors are: Rudy Guenther, Carl Woerner, Ed. Schnell, Pete Reif, Walter Abele, Fred Sonneker and Ed. Fiebrandt.

Lou Reining made a very interesting report of his committee's work on the new sheet metal contractors' national association and the members approved wholeheartedly of the national organization.

Coming Conventions

1944

Mar. 29-30—New York State Sheet Metal, Roofing & Air Conditioning Contractors' Assn., Inc. Annual Convention. Albany, Ten Eyck Hotel. Clarence J. Meyer, State Secretary.

Apr. 12-13—Sheet Metal Contractors Association of Illinois. Annual. Jefferson Hotel, Peoria. Frank Eynatten, Treasurer, Peoria.

Apr. 27-28—Sheet Metal Contractors' National Association, Inc. First Annual. LaSalle Hotel, Chicago. Clarence J. Meyer, National Secretary.

do it...but quickly:

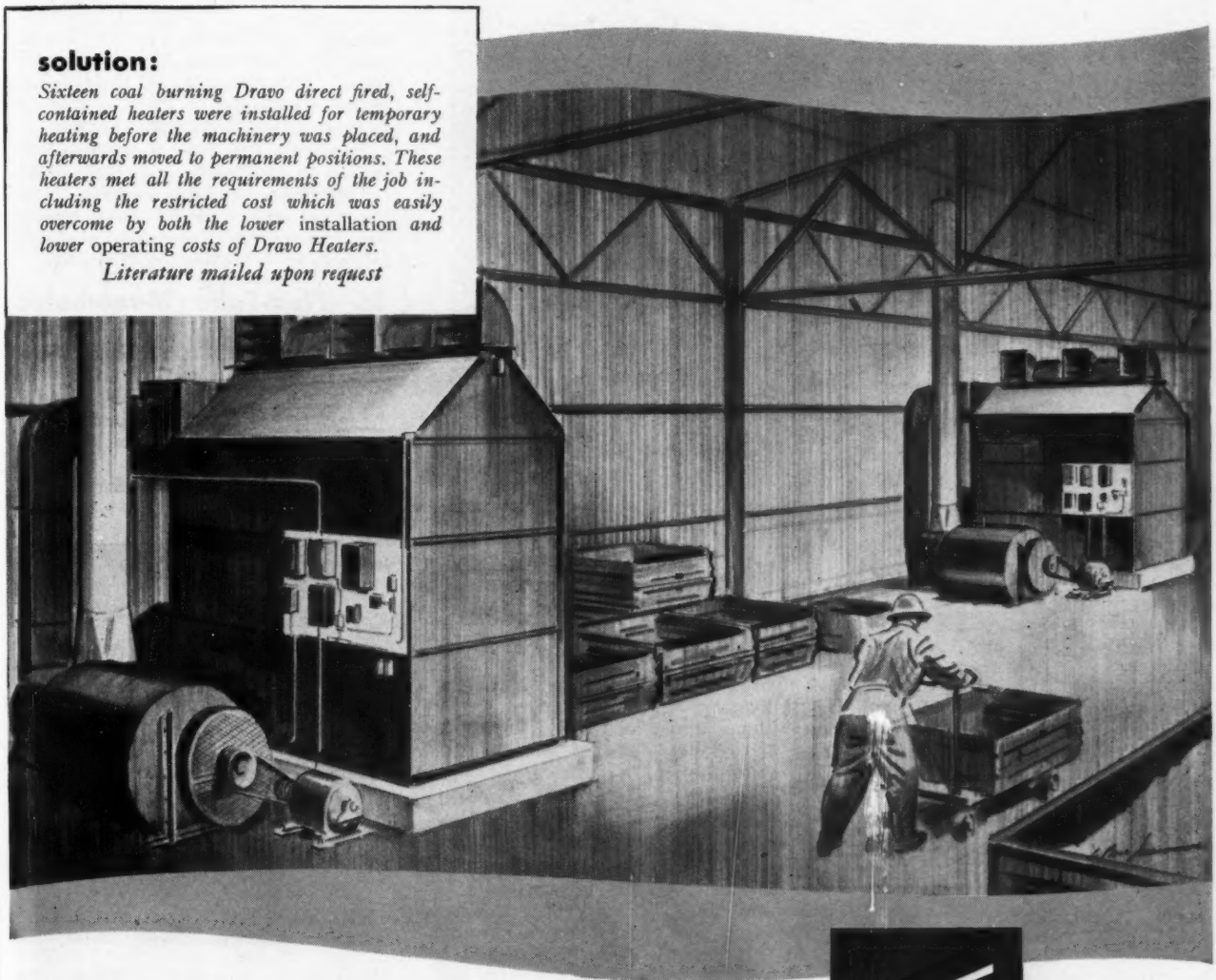
Take a group of Tobacco Warehouses . . . furnish 25,000,000 B. t. u. . . . to facilitate precision machinery work

Several old tobacco warehouses were considered for conversion to the manufacture of precision aluminum aircraft castings. The buildings, varying in size, were light structures without insulation and were widely separated. No oil or gas was available. Heat was required to provide comfortable temperatures for personnel and to eliminate expansion and contraction in the castings. Heat had to be made available before the machinery was installed. A system sufficiently flexible to meet these conditions had to be found, and in addition the rehabilitation contract set an extremely low cost for installation and operation of the heating system.

solution:

Sixteen coal burning Dravo direct fired, self-contained heaters were installed for temporary heating before the machinery was placed, and afterwards moved to permanent positions. These heaters met all the requirements of the job including the restricted cost which was easily overcome by both the lower installation *and lower* operating *costs of Dravo Heaters.*

Literature mailed upon request



DRAVO CORPORATION · PITTSBURGH

DRAVO Heating

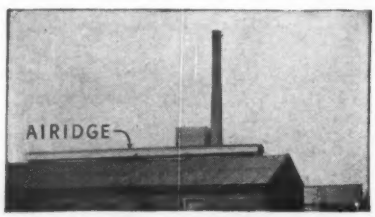
NEW PRODUCTS

For your convenience a number has been assigned to each item. Circle the items in which you are interested on the coupon on page 94 and mail to us.

△ Indicates manufacturer not listed in 1942 Directory.
• Indicates product not listed in 1942 Directory.

• 11—Airidge Ventilator

Aeolus Dickinson, 33rd Street and South Artesian Avenue, Chicago 8, is offering the Airidge ventilator for



effective ridge ventilating, of all materials and sizes. It is shipped in ten-foot lengths. Dampers are optional.

◆

12—Engine Driven Welder

The Lincoln Electric Company, Cleveland, announces a new "Shield-Arc" engine-driven welder rated at 200 amperes of light weight, rugged construction with enclosed, rubber mounted engine of 29 horsepower.

This new unit, supplied with base and canopy has a current range of 40 to 250 amperes. Dual control of welding current is accomplished by adjustment of series fields and generator speed.

For metallic arc welding, with bare or coated electrodes, the new model

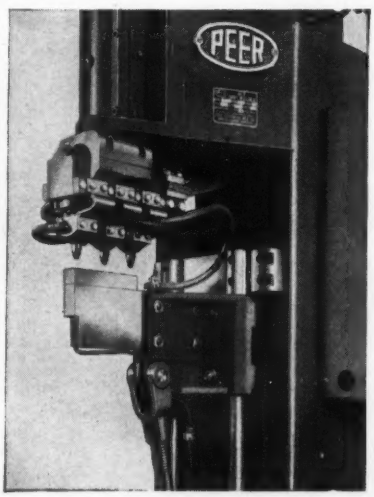
also supplies uniform welding current for carbon arc welding.

The generator control or "job selector" assures accuracy of open circuit voltage and permits precise control of engine speed of from 1,500 to 1,150 rpm for welding. This control may be used to manually reduce the engine speed to as low as 750 rpm.

With this new unit an engine speed of from 1,150 to 1,400 rpm is used for the majority of welding applications.

13—Multiple Spot Welder

Pier Equipment Mfg. Co., 2000 Milton St., Benton Harbor, Mich., announces a new multiple electrode, air-operated spot welding equipment.



Pier air-operated multiple spot welder

One of these heads, a 3-point unit, is shown employed on a Peer press type welder.

◆

• 14—Thermo-Pilot

The Perfex Corporation, 500 West Oklahoma Avenue, Milwaukee 7, has developed a new long-life stoker timer relay operated on the principle of Thermal Action.

This new control eliminates the complicated motors, gear trains, ratchets, etc., of the old style clock timers. It has only two moving units.

In operation, heat is provided to a bimetal coil by electric current. When sufficient heat energy has been stored in this bimetal element, a circuit is closed which energizes the relay and starts the stoker. As the bimetal element cools, the relay is de-energized, the stoker stops and the heating cycle of the bimetal element is resumed. This hold-fire operation can be governed for short, medium or long operating periods at from one-half to one hour intervals.

Thermo-Pilot requires no servicing, lubrication or maintenance, and can be used with practically any stoker control circuit.

• 15—Alloy Solder

Eutectic Welding Alloys Company, 40 Worth St., New York City, has developed several alloys which offer the advantages of silver solder, plus greater strength, firmer bonds, and greater hardness—yet contain very little or no silver.

The alloys are available in convenient sizes—wires, strips, sheets and rods, and some in fine powder form. The principles of their application are similar to those of brazing in preparation, fluxing and heating.

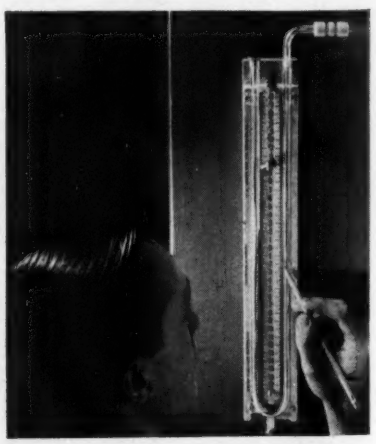
Basically, the flow of these alloys is due to capillarity, with the added feature that they have a strong alloying effect on the parent metal, resulting in a stronger bond than that obtainable with brazing or soldering.

◆

16—Flex-Tube Manometer

F. W. Dwyer Mfg. Co., 565 W. Washington St., Chicago, offers the Flex-Tube manometer. Shatterproof Tenite replaces glass tubing to make manometers to meet the demand for unbreakable gages—both portable and stationery.

The Tenite tubing is seamless and easily bent into the desired position.



The ends are threaded for screw caps. L-connectors of slightly smaller tubing are convenient means of venting the gages to atmosphere and opening them for the addition of fluid. These are tapered and pressed in to make leakproof connections. The fluids used are water, oil, and mercury. The tubing is extruded by Sandee Mfg. Co., Chicago. The Tenite used is a cellulose acetate butyrate product of Tennessee Eastman Corporation, Kingsport, Tenn.

This, too, is YORK HEAT

The LAUNDRY Goes Rolling Along

YORK Oil-Burner applications, on portable laundry units for the Army, have solved one of the soldier's most harassing problems. One might call them the caissons of morale.

The application of an oil-burner to the boiler specified, was no mean feat, but York engineers took the job in their stride. The have the persistence and the know-how, to stay with the tough ones until they're licked. That's why York heating equipment has always been more efficient and dependable. That's how the basic soundness of their design is being perfected by the gruelling tests of war.

When peace-time production is resumed, you will do well to consider the manifest advantages of heating equipment by York . . . a pioneer in the oil-burner field, which has not rested on its laurels.

YORK HEAT

Division of
YORK-SHIPLEY, INC.
York, Pa.

Starching-Up for Post-War Appearance

THIS story of portable laundries fired by YORK is another in a series building good-will with post-war customers. Fortunately for YORK, one of their largest contributions to the war-effort has been oil-fired heating and processing equipment. They have been continually developing and improving their equipment to meet difficult performance requirements.

When the war is over, YORK will be ready with many worthwhile advantages that will mean new comfort and new economy. That's the story we are telling millions of people, month after month. That's the reason YORK HEAT will have the greatest demand in its long and successful history.

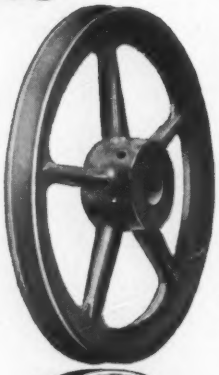
This is another of the YORK HEAT *advertisements appearing regularly in:* AMERICAN HOME . HOUSE *and* GARDEN . HOUSE BEAUTIFUL . BETTER HOMES *and* GARDENS . TIME (Canadian Edition) . BUSINESS WEEK.

YORK HEAT

***Division of* YORK-SHIPLEY, INC., YORK, PA**

MAUREY V-PULLEYS

provide a L-O-N-G step toward TROUBLE FREE Performance

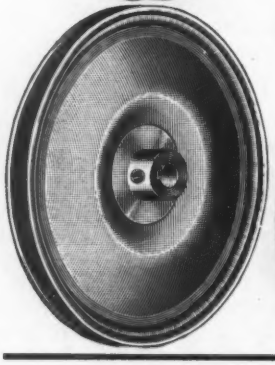


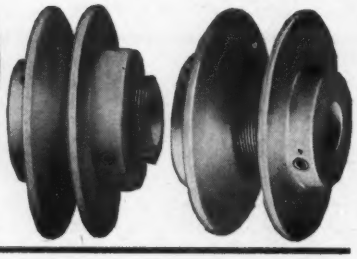
Our long experience in designing and manufacturing V-Pulleys, our complete understanding of their uses, and the finest materials—all are combined in making Maurey V-Pulleys the very best for use in Air Conditioning and Refrigeration Systems as well as for Fan and Blower insulations.

For unfailing, continuous operation be sure to specify Maurey V-Pulleys.

MAUREY MANUFACTURING CORP.

2915 South Wabash Avenue
CHICAGO 16, ILLINOIS





New Literature

For your convenience in obtaining copies of New Literature use the coupon on page 94.

205—Free World Map

L. B. Allen Co., Inc., 6717 Bryn Mawr Ave., Norwood Park Station, Chicago, offers a free world map—a complete up-to-the-minute world atlas, suitable for framing —17¾ by 22½ inches in size.

◆

206—Cutting and Crimping Machines

Charles E. Kraus Mfg. Co., 929 W. Main St., Louisville, Ky., is distributing an envelope stuffer describing their American cutting and crimping machines for stove pipe, furnace pipe and flat sheet metal. Specifications are included.

◆

207—Lion Cowl Fastener

Talon, Inc., Aero Products Division, Meadville, Pa., is distributing a 16-page catalog covering their Lion cowl fastener—a spring locking device designed for aircraft use where non-rigid fastening and ready accessibility are required. The device is also satisfactory for inspection panels on ducts, furnaces, etc.

There are three sizes, with specifications, installation instructions, and tools required for installation, as well as important features of the fasteners.

◆

208—Maintenance Arc Welding

The James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland, has published "Maintenance Arc Welding"—first edition—with 242 illustrations, bound in semi-flexible simulated leather, 6x9 inches, with 233 pages, fully indexed, gold embossed. This is the second important book to be developed from the 1940-42 Industrial Progress Award Program—comprising 25 of the most significant award papers in the program's maintenance classification.

This compilation deals with the use of arc welding in reclaiming broken and worn parts and also gives details on the application of welding in the fabrication of replacements. Price 50 cents in the U. S., 75 cents elsewhere.

◆

209—Hydraulic Surface Grinding

Savage Tool Company, Savage, Minn., is distributing a new 20-page book picturing and describing the complete line of DoALL surface grinding equipment, accessories and supplies.

The booklet shows the importance of unity when extreme accuracies and fine finishes are to be achieved in surface grinding operations. To accomplish these requirements of precision surface grinding, the company offers three hydraulically operated grinders ranging in capacities from 7½ x 21 inch to 10 x 24 inch capacities. This wide range provides a machine for either tool room or production work.

With these surface grinders, unity of control throughout the whole grinding process is provided with the specially designed and constructed DoALL grinder accessories. Specifications and application data are shown as applied to either tool room or production grinding.

Among these DoALL accessories are the DoALL grinding wheels, selectron and electromagnetic chucks and the wet or dry grinding attachments including a specially prepared DoALL soluble oil for wet grinding.

The DoALL Selectron controls the amount of magnetic power being transmitted by the DoALL Chuck and also demagnetizes the chuck when work is to be removed.

This modern, well-equipped laboratory, manned by a staff of specially trained technicians, is a permanent part of Mueller's facilities.
L. J. MUELLER FURNACE CO.
AIR CONDITIONING
For extra heating satisfaction — on your post-war jobs...

MUELLER'S *Complete Heating Service*

is backed up by continuous laboratory research and engineering development

The further development and refinement of Mueller heating products is going on at all times — now more than ever, in order that you may have outstanding heating equipment to sell and install after the war. This is one of many reasons why it pays to deal with Mueller — and obtain, from one dependable source, a line that is complete from every angle . . . sizes, price range, types and designs for specific fuels. This complete line of nationally-known, nationally-advertised heating equipment places you in a strong position to compete for the heating contract on any building — from a cottage to a factory. Write for bulletins giving complete information. *L. J. Mueller Furnace Co., 2010 West Oklahoma Avenue, Milwaukee 7, Wisconsin.*

D-38

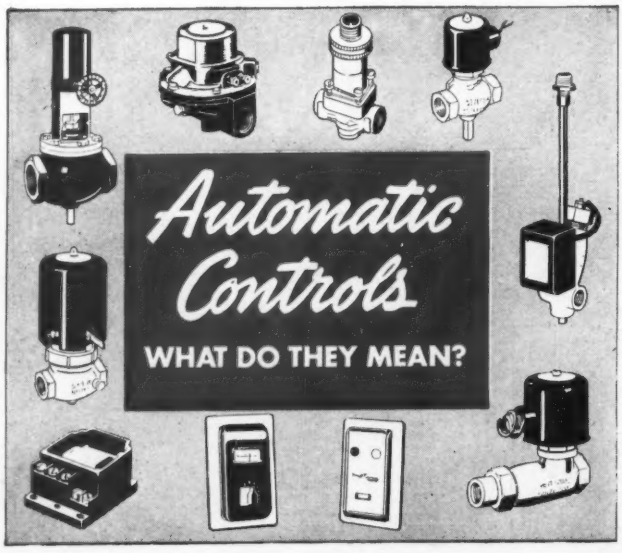
Gas Mueller offers a complete line of gas-fired equipment — including winter air conditioners, gravity furnaces, boilers, unit heaters.

Oil Mueller oil-designed winter air conditioners equipped with pressure atomizing or vaporizing oil burner.

Coal The Mueller line includes a wide range of winter air conditioners and gravity furnaces, stoker- or hand-fired.

MUELLER *Climatrol*

HEATING AND WINTER AIR CONDITIONING



Automatic controls of pressure, temperature and flow assure *pre-determined accuracy of results* wherever they are used. No thinking executive, production manager or maintenance engineer can miss the full significance of this statement.

In factories and plants of every size and kind, *automatic controls* increase productive output and reduce waste by simplifying operations, speeding work, and assuring uniformity of finished product. With controls, even the most inexperienced novices quickly attain proficiency.

In homes and buildings, large and small, *automatic controls* promote economy, comfort, health by providing optimum temperature and humidity, saving fuels and doctors' fees.

On stationary equipment such as presses, machine tools, internal combustion and diesel engines, *automatic controls* save materials, plumbing, space, time and money.

On moving equipment such as aircraft, ships, tractors, trucks, tanks, locomotives, **hi-g** *light-weight controls* assure efficient performance because they operate in any position, regardless of vibration, change of motion or acceleration. **hi-g** saves weight and space.

Although now engaged full-time in supplying war needs, General Controls' staff of "straight-thinking" engineers invite your request for help in solving your post-war control problems. For complete description of General Controls' broad line of automatic pressure, temperature and flow controls, write for Catalog 52.

HIGH CAPACITY AT LOW COST

V-300 Low Pressure Gas Regulators are compact, built to last. For natural, manufactured and L.P. gases. Sizes from ⅜" to 2" I.P.S. Outlet pressures from 2" to 5"; factory setting 3½" for average appliance use.

GENERAL CONTROLS

801 ALLEN AVENUE, GLENDALE 1, CALIFORNIA

BOSTON • NEW YORK • PHILADELPHIA • DETROIT
CHICAGO • CLEVELAND • DALLAS • DENVER • SAN FRANCISCO

New Literature

For your convenience in obtaining copies of New Literature use the coupon on page 94.

210—Agitair Products

Air Devices, Inc., 17 East 42nd Street, New York 17, N. Y., is distributing an 8-page and cover bulletin with a working knowledge of Agitair products and their applications: Air diffusers, heavy-duty ranges, bake ovens and stoves, air exhausters, air filters, hot water generators, heat baffles for oil burners, and hot gas generating furnaces.

◆

211—Band Filing to Precision Tolerances

Continental Machines, Incorporated, 1301 Washington Avenue South, Minneapolis, offers a 4-page bulletin on "Band Filing to Precision Tolerances" for higher-speed, lower-cost production on internal and external continuous file broaching—metals, alloys, plastics, fibre and wood.

◆

212—Vanco Power Roof Ventilator

E. Van Noorden Company, 100 Magazine St., Boston 19, is distributing a 4-page folder entitled "Vanco Up-Blast Power Roof Ventilator." The Vanco is an open-top power ventilator equipped with automatic opening and closing weather-tight dampers. The open top and butterfly dampers are the essential features. When the fan is started, the dampers rise, and velocity of upward blast prevents entrance of rain or snow. When the fan is shut off, the dampers automatically close and are weathertight.

◆

213—Low-Temperature Welding

Eutectic Welding Alloys Company, 40 Worth St., New York 13, is distributing a 36-page welding data book of facts on low temperature welding for fabrication, salvaging and general maintenance in all types of war industries and postwar applications. There are helpful hints on how to increase welding efficiency on all metals as well as complete instructions for easy, low-cost salvaging for vital war production tools. A special chart, devised to simplify rod selection and use, is reproduced on pages 34 and 35; also available in large poster size.

◆

214—Hole Punching Technique

Wales-Strippit Corporation, 345 Payne Avenue, North Tonawanda, N. Y., offers Brochure PS which illustrates and describes Wales Plate Set System of hole punching technique.

Briefly, this system consists of Walesite Plate Sets and Wales "PS" Punch Assemblies and Dies which provide the following features:

Easily assembled on bench outside of press
Place in press and start punching
Nothing attached to press ram
Punches and Dies held in perfect alignment
No locating
No adjusting
Interchangeable punches, guides and dies
Center-to-center hole distance as close as ½ inch in any direction
Same Punch Assemblies and Dies may be used and reused in unlimited Plate Set Assemblies.

◆

215—Arc Welding Procedures for Cast Iron

C. E. Phillips & Company, 2750 Poplar St., Detroit 8, has just published a 12-page illustrated booklet entitled "Four Ways to Salvage, Reclaim and Conserve Iron Castings by Electric Arc Welding."

Four types of electrodes for use on cast iron are described, and the characteristics and best welding procedures for each are explained.

SPRING

Ushers in Plenty of REPAIR WORK

SPRING is the season of overhauling and general repairs. With spouting, roofing, painting and furnace work there will be hundreds of repair and maintenance jobs to be done on homes as well as in factories and other buildings.

Get set for the rush now by ordering your stocks of necessary material and equipment. We are in fair shape at present to take care of your requirements but would urge you to get your orders in early so that you will be ready to get your share of the miscellaneous profitable business that the busy Spring season always brings.

Due to war limitations on transportation the OSBORN man is unable to call on you as frequently as he would like. Between his calls, therefore, if you are in urgent need of materials we suggest you write us direct. We'll do our best to give you the service you require.

THE J. M. & L. A.

OSBORN Co

CLEVELAND, OHIO

BUFFALO • CINCINNATI • DETROIT

Manufacturers—Distributors of Metals and Metal Products

PRIME METAL SHEETS
EAVES TROUGH, CONDUCTOR PIPE, ETC.
ROOFING, NAILS AND PAINTS
FURNACES AND ACCESSORIES
SHEET METAL TOOLS AND MACHINERY

A DEPENDABLE SOURCE OF SUPPLY FOR 85 YEARS

FROS-T-AIRE
COMFORT COOLING

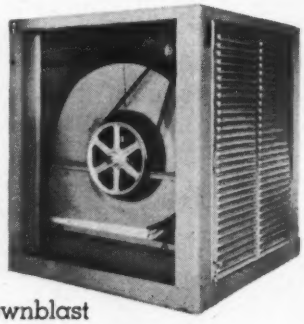
The cooler for cool profits!

ORDER NOW
FOR SPRING BUSINESS

All types immediately available!

Frost-T-Aire evaporative coolers are the perfected result of over 30 years of manufacturing and testing in the Arizona desert.

All types, ranging in size from 2500 CFM to 30,000 CFM, available at once for Army or Navy Defense Plants, and for others authorized on Forms PD830, PD1A; PD1X. Consult local WPB ofc.



Downblast

SNO-FLUF
PERFECT COOLER PADS
Shredded from prime aspen

For all makes of evaporative coolers. Insect-proof, netting covered. Fresh from the forest, to the factory, to you. Also Sno-Fluf excelsior in convenient cooler pack bales.

Palmer
Manufacturing Corp.
PHOENIX, ARIZONA

In the "air-conditioned capital of America"

PALMER MFG. CORP., PHOENIX, ARIZONA
N3

Please send me illustrated literature & prices on:

☐ Frost-T-Aire Evaporative coolers ☐ Quiet-zone blowers ☐ Sno-Fluf cooler pads and excelsior

FIRM NAME.....

Address.....

City.....State.....

New Literature

For your convenience in obtaining copies of New Literature use the coupon on page 94.

216—Shop Problems for Hand Skill

The Metal Crafts Guild, P. O. Box 142, Flatbush Station, Brooklyn, N. Y., has published a two-color, illustrated and practical shop manual—"Suggested shop problems for Hand Skill Practice" in Aircraft and specialized sheet metal work, by I. D. White. Price $3.50 postpaid.

The manual contains 104 pages 8½ x 11, spirally bound consisting of six groups of simple procedures for hand skill practice convenient for home, shop or school use. There are 60 easy-to-make projects, 78 blueprints, 125 hand tools, bench and floor machinery, and other useful data on blueprint reading, sheet metal drafting, layouts, pattern making, assembly, riveting, etc.

◆

217—"Quality Control" of Fine Dimensions

Continental Machines, Inc., 1301 Washington Avenue South, Minneapolis 4, has just released "Quality Control"—a pocket-size handbook on scientific inspection. Gage blocks, gage instruments and accessories are described, including the new Mobile Inspection Unit which brings the inspection department right to the point of work. Many tables and data pertaining to gaging methods used in precision measurement are included. One section highlights 24 subjects vital to precision measuring and explains the use of many precision instruments such as the sine bar, vernier gage, optical flats, etc. At the end of the book 53 key questions are given with their answers, serving both as a check and test of the knowledge gained by the reader in studying this handbook.

Photographs, diagrams, charts and tables make the explanation of the use of precision measuring instruments to interpret fine dimensions concise and interesting.

◆

218—Weld Inspection Chart

The Lincoln Electric Company, Cleveland, is publishing an entirely new and comprehensive arc welding inspection chart, designed so that operators and inspectors can tell at a glance whether welds are being properly made.

This graphically illustrated chart pictures actual specimens of various results obtained in making fillet and butt welds and describes briefly the appearance and characteristics of proper and improper weld beads, with a brief description of the conditions under which each was made.

A portion of the chart is devoted to a description of the widely used "Fleet-Fillet" welding technique, telling of its advantages, where and how to use, and including a table on the procedure for single-pass horizontal and positioned fillets with "Fleetweld 11" which carries data such as electrode sizes, desired current, burn off rates and arc speed.

The chart should prove extremely helpful to everyone interested in speeding up arc welding production and in achieving the most satisfactory results from his work. It is printed in two colors on a heavy grade of stock measuring 23 by 35 inches, and is available without charge to inspectors, operators and others concerned with welding.

◆

219—Consumer Literature

Heating and Air Conditioning The Postwar Home—is a consumer booklet being offered to the public on the radio and in national advertisements by the Minneapolis-Honeywell Regulator Company, Minneapolis 8, Minnesota,—16 pages and cover—with questions on the fuel bill, temperatures of various rooms, hot ceilings, cold walls, drafty floors, fuel saving from unoccupied rooms, and how to correct these faults or gain these advantages.

Read how G-E dealers stand to profit in the busy *Heating Market of Post-war*

AFTER THE WAR, G-E Automatic Heating equipment dealers, will have a powerful, perhaps a scales-tipping sales advantage in General Electric research and vast wartime engineering experience.

Years of research have made the G-E trade-mark one of the world's most familiar symbols—and the widespread public acceptance for G-E products is going to mean much to G-E dealers in the keenly competitive replacement and new construction heating markets of post-war.

But more than that . . . come Victory, new General Electric heating equipment will be born of this research and experience—compact, quiet, efficient, easy to install, easy to service . . . easier, too, for you to sell! *General Electric Company, Heating Division, Section 4533, Bloomfield, New Jersey.*

THE EXCLUSIVE G-E MOTOR COMPRESSOR — a revolutionary research development in pre-war G-E heating units. Oil pump, fan, compressor, and motor mounted on one-piece shaft for permanent alignment. No gears, pulleys, or belts to cause trouble. Self-lubricating. Complete assembly spring mounted, flexibly coupled, for quiet operation. Out of today's research will come other exclusive selling features . . . and new opportunities for G-E Heating equipment dealers.

☆ BUY WAR BONDS ☆

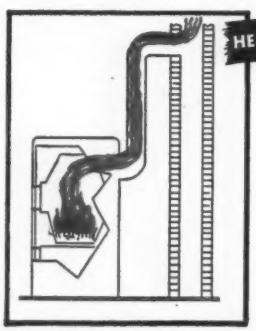
GENERAL ELECTRIC

Hear the General Electric Radio Programs: The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 p.m., E W T, NBC..." THE WORLD TODAY" News, Every Weekday 6:45 pm., E W T, CBS

MAKES FUEL GO FURTHER

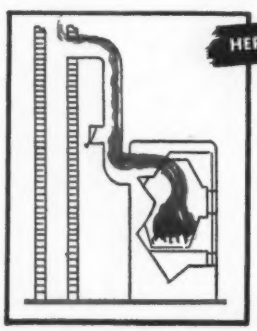
Field

BAROMETRIC DRAFT CONTROL



HERE'S YOUR PROBLEM:

The chimney draft in 9 out of 10 stoves is excessive. Thus, gases which have liberated only part of their heat are continually drawn up the stack. Manual regulation is only partially effective. But the FIELD DRAFT CONTROL, holding draft to a bare minimum, is the complete, ideal answer.



HERE'S YOUR ANSWER:

The FIELD CONTROL constantly and automatically compensates for fluctuations in draft; holds the draft to that minimum needed for proper combustion. Thus the FIELD CONTROL s-t-r-e-t-c-h-e-s FUEL 5% to 25% further. Write us today for information on the complete FIELD CONTROL line for domestic and commercial installations.

New Literature

For your convenience in obtaining copies of new literature use the coupon on this page.

220—Decimal Equivalent Chart

The Dayton Rogers Manufacturing Company, 2835 12th Avenue South, Minneapolis 7, announces that they now have for free distribution a framed decimal equivalent chart with glass protected table, size 13 x 18 inches. This makes a permanent piece of engineering information, due to the glass frame protecting the chart.

◆

221—Slitting Shears, Punches and Bar Cutters

Buffalo Forge Company, 497 Broadway, Buffalo, is distributing Bulletin No. 360—24 pages and cover—entitled "Buffalo" Combination Slitting Shears, Punches and Bar Cutters. These heavy metal working machines are illustrated and described, with capacities, specifications, and special tools available.

◆

222—Moduflow Control System

Minneapolis-Honeywell Regulator Company, Minneapolis 8, Minnesota, has prepared the first edition of an "Engineering Discussion on the Moduflow Control System." Twelve pages and cover (8½ x 11) discuss the theory of human comfort, the Moduflow heating control systems with diagrams of single and multiple sections, with typical specifications.

◆

223—Pickle Bath Toners

American Chemical Paint Company, Ambler, Pa., offers revised Technical Service Data Sheets covering their ACP Pickle Bath Toners Nos. 1 and 2 (liquid) and Nos. 101 and 102 (powdered).

These technical service data sheets tell what the ACP pickle bath toners are, what they do, and conditions under which the toners are used.

◆

224—Marine Coppersmithing

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City, has just published the first edition of "Marine Coppersmithing," by Frank J. Carr. Price $2.00.

The author has written the book, not to take the place of visual instruction, but to supplement it, and has tried to show what seemed to him the best and simplest way of doing marine coppersmithing. There are 195 pages of text and illustrations covering tools and equipment, heat, annealing and melting temperatures, acids, tinning and the use of solders, brazing, flanges, cup joints, branches, tube bending, templating, expansion joints, sheet brazing, sheet bends, testing, shipwork, compartmentation, ship's terms, and index.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

11	12	13	14	15	16			
205	206	207	208	209	210	211	212	213
214	215	216	217	218	219	220	221	222
223	224							

Name .....
Company .....
Address .....

Are you Manufacturer——Jobber——Dealer——

Start now to sell your customers and prospects the idea of avoiding most of the drudgery of next spring's housecleaning.

Detroit Air Filters do the housecleaning in the basement, during the winter, by cleaning and purifying the air before it gets into the house. Grime which would otherwise spread through the house, is caught by these efficient filters.

They're profitable—and you can sell them freely because they use no critical material.

Note **THESE OUTSTANDING POINTS OF SUPERIORITY**

ECONOMY—Patented cellular design gives more filtering capacity per dollar.

FREE AIR FLOW—Uniform air distribution assures free flow with maximum filtering.

DUST CAPACITY—Thoroughly impregnated with a special compound to retain dust collecting ability indefinitely.

ODORLESS—Adhesive material is absolutely odorless and will not turn rancid.

LONG LIFE—Entire depth of filter used in cleaning, thus providing long and efficient filtering.

STRENGTH—Selected materials and sturdy construction prevent sagging. No danger of small particles being carried into air stream.

POLLEN—Highly effective in providing relief for persons allergic to air-borne pollen.

An attractive envelope stuffer is available imprinted with your name. If you want some to send out to your customers, drop us a line on your letterhead.

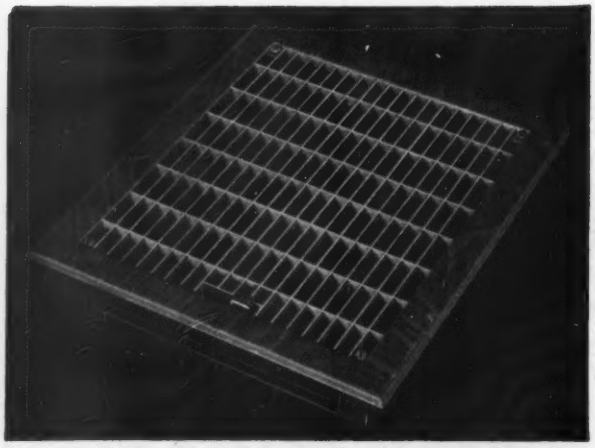
DETROIT LUBRICATOR COMPANY

General Offices: DETROIT 8, MICHIGAN

Canadian Representatives—Railway and Engineering Specialties Ltd., Montreal, Toronto, Winnipeg

Division of American Radiator & Standard Sanitary CORPORATION

"DL" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • Radiator Valves and Balancing Fittings • Arco-Detroit Air and Vent Valves • "Detroit" Expansion Valves and Refrigeration Accessories • Air Filters • Stationary and Locomotive Lubricators



H & C No. 210 "NO-FLEX" FLOOR REGISTER

Welcomed Back by a HOST of Heating Men!

Good news to that great majority of heating men who prefer the H&C No. 210 "NO-FLEX" floor register to all others, was the announcement made last month that this finest of floor registers is again in production. And we are happy to state that it is now available in all standard sizes in both black and oak finishes.

Heating men who appreciate that it pays to use the best, particularly when it involves no extra cost, will again standardize on No. 210. It's neat, trim and attractive, exceedingly sturdy, and possesses large free area.

Practically all our standard gravity and air conditioning registers are now being manufactured to the full extent of our C. M. P. allotments, and prompt shipment of register orders for essential current needs may be expected.

Catalog No. 42 is current catalog of complete line of Gravity and Air Conditioning Registers and Accessories. Ask your jobber for our January 1, 1944 Trade Discount Sheet.

H&C

HART & COOLEY MANUFACTURING CO.

World's Largest Manufacturers of Registers, Grilles, Furnace Accessories

HOLLAND • MICHIGAN

Fundamental Fan Laws

(*Continued from page 77*)

centage changes in volume, pressure, and horsepower for variations in speed from 50 below original to 75% above original speed.

Illustrating the use of these curves, take the problem, previously solved algebraically, involving a warm air heating system requiring a 10% increase in air volume. From the first fan law, we know that 110% of original volume will require 110% of original speed, or this percentage speed increase can be read from the curves. Now proceeding horizontally right from 110% of original speed to the horsepower curve, we find that the new horsepower will be 134 per cent of original, and therefore, new horsepower will be $5 \times 1.34 = 6.7$.

It is apparent from an inspection of these percentage curves that a considerable increase in air volume, on a fixed system, can only be obtained by what is usually a prohibitive increase in power consumption. Consequently, it is highly essential to have the pipes, collectors, and other component parts of the system of ample size since, if they are too small, little can be done without excessive power consumption to improve low air volume conditions.

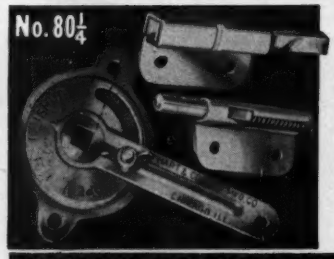
H&C DAMPER REGULATOR SETS

ECONOMY TYPE. Three ways to install: 1. With lock nut but without handle (for tamper-proof setting). 2. With handle and lock nut. 3. With handle and wing nut. Nut prevents damper vibration. Handle always indicates position of damper (Patent 2,146,142). Furnished with handy snap end bearing. Complete set in carton. Made only with ¼" bearings.

LIST PRICE.....No. 40¼S....$0.30

BRACKET TYPE. Nut holds damper securely, preventing vibration. Handle which indicates position of damper, may be left in place permanently or removed after adjustment (to prevent tampering). Snap End Bearing on ¼" size, Solid Bearing on ⅜" size. Each set individually packaged.

LIST PRICES.....No. 50¼.....$0.40
No. 50⅜ $0.40



DISK TYPE. Like all H&C sets, this set is equally adaptable to splitter or regular dampers. Snap End Bearing on ¼" size, Solid Bearing on ⅜" size. All parts are rust proofed. Complete set in carton.

LIST PRICES.....No. 80¼.....$0.40
No. 80⅜ $0.40

See your jobber or write for literature and sample.

HART & COOLEY MANUFACTURING CO.
HOLLAND, MICH. · PHILADELPHIA OFFICE: 1600 ARCH ST.

Moncrief

-the GIBRALTAR of WARM AIR FURNACES

SERIES C Coal Burning Hand Fired Furnace

LIKE the Rock of Gibraltar, that has stood guard for these countless thousands of years, the job of guarding the heating comfort in thousands of American homes has been a MONCRIEF job.

For almost 50 years, Moncrief products have been guarding the well-being of innumerable households, guarding the reputations of thousands of Moncrief dealers, and guarding against excessive heating and maintenance costs on the home front.

During this period Moncrief has been guarding its reputation as the builders of furnaces that are durable . . . efficient . . . reliable.

When the war is won Moncrief products will continue as a leader in the warm air heating and air conditioning market with a complete line of up-to-the-minute heating equipment for coal . . . gas . . . oil.

MONCRIEF will continue to guard the heating comfort in the thousands of homes of tomorrow.

MONCRIEF'S new catalog of warm air pipe, fittings and specialties is just off the press. Send for your copy.

MONCRIEF
SINCE 1895

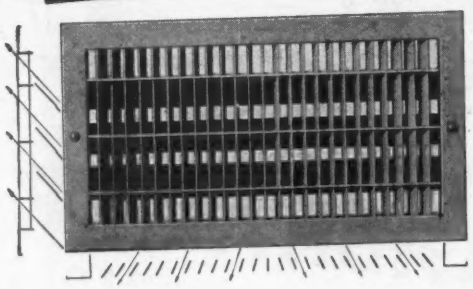
WARM AIR FURNACES
FURNACE PIPE and FITTINGS

AIR CONDITIONING SYSTEMS
FOR COAL . . . GAS . . . OIL

THE HENRY FURNACE CO. **MEDINA, OHIO**

INDEPENDENT "Fabrikated" REG U.S. PAT. OFF.

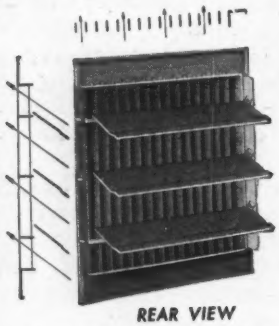
DIRECTED AIR FLOW GRILLES with Deflecting Vanes



No. 321A

Gives Compound Direction to Air Flows with Certainty

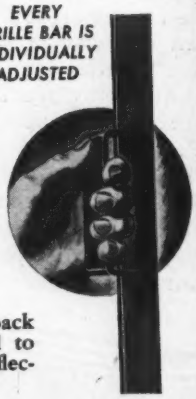
Each grille bar can be adjusted individually to direct air flow to the right, left or fanwise as illustrated. Adjustment can be made either before or after installing. Grille bars remain firmly in position without locking, and will not vibrate nor rattle.



REAR VIEW

Horizontal deflecting vanes in back may be individually adjusted to give upward or downward deflection to air flow.

EVERY GRILLE BAR IS INDIVIDUALLY ADJUSTED



Send for Catalog No. 41-AC

641

THE INDEPENDENT REGISTER CO.

3747 E. 93rd STREET • CLEVELAND, OHIO

With the Manufacturers

Lima Supply Occupies Own Building

Lima Supply Company, wholesale sheet metal, Lima, Ohio, asks to have their address changed to their present and permanent location in their own building at 311 North Central Avenue, with over 5,000 square feet of floor space. Stock is being built up to have a complete service for the sheet metal trade, selling wholesale only.—John F. Stuber.

◆

Lincoln Appoints Brugge

The Lincoln Electric Company, Cleveland, announces the appointment of **B. J. Brugge** as welding engineer in the Detroit office.

Mr. Brugge, who has been associated with Lincoln since 1931, has served in the Los Angeles, California, and Houston, Texas, offices and, until his transfer to Detroit, has been located in Washington, D. C.

In his new position Mr. Brugge will be engaged in welding engineering work in Detroit where his wide experience in all phases of arc welding will be available to firms in that area for assisting them in the design and fabrication of both present and post-war products.

◆

Famous Sixth Annual Banquet

The Annual Banquet of The Famous Furnace Co., of Cleveland, manufacturers and jobbers of sheet metal, furnaces and roofing supplies, was held on Saturday, December 11, 1943, at the Fenway Hall Hotel in Cleveland.

For the sixth consecutive year, bonuses were distributed

to the employees by Hyman Blaushild, president of the concern. Mr. Blaushild spoke to the employees, regarding present world conditions, and he expressly hoped that the employees would use part of their bonuses in the purchasing of United States Defense Bonds. Mr. Blaushild also very generously remembered each of his former employees, now in the United States Armed Forces, with a bonus check equivalent to their 1942 bonuses.

The employees presented Mr. Blaushild with a gift in appreciation for his many kind generosities.

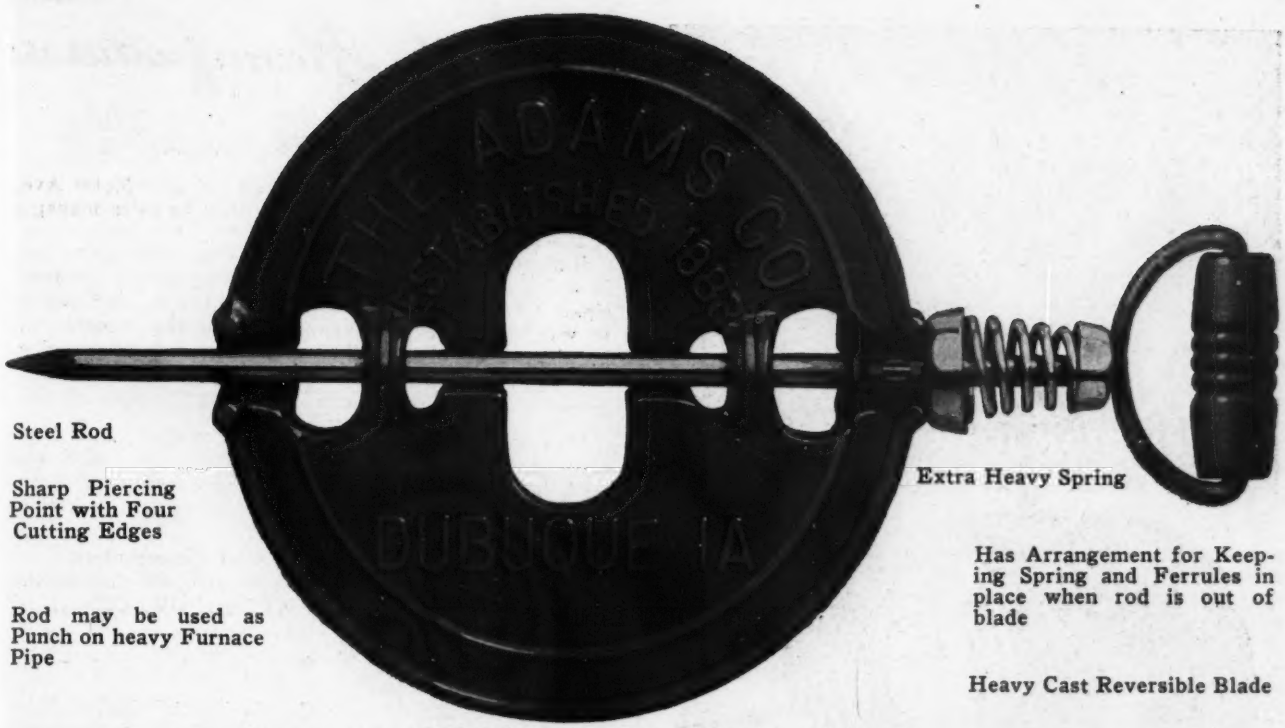
◆

Allegheny Ludlum Appoints Arbuthnot

To consolidate its manufacturing and distribution facilities in the Detroit district, the Allegheny Ludlum Steel Corporaton, Brackenridge, Pa., has established a new Regional Managership in that area, according to President H. G. Batcheller.

The move was effective on January 1 and responsibilities of the Detroit Regional Manager's position have been assumed by H. N. Arbuthnot, who was Allegheny Ludlum's Assistant General Manager of Sales, prior to the new appointment. In 1926 Mr. Arbuthnot became Detroit District Manager for the former Allegheny Steel Company, where he served until he was made Assistant General Manager of Sales at Brackenridge.

In Mr. Arbuthnot's current capacity as Detroit Regional Manager, the effect will be to consolidate the direction of Allegheny Ludlum's manufacturing unit in that area, the Forging and Casting Division, and its Detroit Sales Branch, both of which are located in the Ferndale district.



Steel Rod

Sharp Piercing Point with Four Cutting Edges

Rod may be used as Punch on heavy Furnace Pipe

Extra Heavy Spring

Has Arrangement for Keeping Spring and Ferrules in place when rod is out of blade

Heavy Cast Reversible Blade

• 1883 — Sixty-One Years of Service — 1944 •

ADAMS DIAMOND SMOKE PIPE DAMPER

MANUFACTURED BY

THE ADAMS COMPANY

DUBUQUE, IOWA, U. S. A.

No matter how involved your plant layout may be, here is the most efficient solution of your heating problem:

DIRECTHERM

UNIT HEATERS STOKER-FIRED

HEAT MORE SPACE AT LESS COST

LOW INITIAL COST	— Saves money the first day
SIMPLE INSTALLATION	— No duct work, radiators or pipes needed
LITTLE MAINTENANCE	— Automatic controls do the work
WIDE HEAT SPREAD	— Heat "fans" out 200 feet
6 SIZES, Also for Oil and Gas	— 300,000 — 1,700,000 BTU

May we send you our descriptive bulletin?

AIRTHERM MANUFACTURING CO.

706 S. SPRING AVE., ST. LOUIS 10, MISSOURI

POSTWAR PLANNING? ...Why Certainly!

BUT THE RELIABILITY OF THE MOTORS YOU NEED *RIGHT NOW* FOR WAR PRODUCTION IS IMPORTANT, TOO

Wagner Splash-Proof Motor, 365 frame, two-speed, 1750/1160-rpm.

Sure, we know that postwar planning is necessary. Every manufacturer must stay abreast of the times and be ready to again serve its customers after this war is won–But, Wagner realizes there is a war to win and it is our first job. Wagner is now turning out more motors than ever before–working around the clock to furnish these motors wherever they are needed to help in the war effort. If you need motors now to help speed up the war effort –consult Wagner.

Wagner MOTORS

Write FOR BULLETINS

MOTORS
TRANSFORMERS
UNIT SUBSTATIONS
INDUSTRIAL BRAKES
BRAKE LINING

Bulletins MU-183 and MU-182 describe and illustrate the complete line of Wagner motors. Bulletins MU-7B and MU-30B give complete service instructions.

M44-3B

BACK THE ATTACK — BUY U. S. WAR BONDS

Wagner Electric Corporation
ESTABLISHED 1891
6371 Plymouth Avenue, St. Louis 14, Mo., U. S. A.
ELECTRICAL AND AUTOMOTIVE PRODUCTS

With the Manufacturers

Hammel Plans Post-War Expansion

Hammel Radiator Engineering Co., of 3348 Motor Ave., Los Angeles, has appointed **L. M. Hull** as sales manager of the Heating Division.

Hammel Radiator Engineering Co. is a co-partnership in which **A. S. Martinson** and **S. D. Crozier** are the principals. Present activities of the plant are devoted largely to war work plus the manufacture of the Hammel Oil burning, dual type wall furnace for defense housing.

◆

Malcolm Lund, who recently served as Campaigns Manager on national conservation programs for WPB and OPA in Washington, is now handling war fuel conservation work with **Perfex Corporation**, Milwaukee, makers of automatic controls and radiators.

Perfex is associated with the Fuel Conservation Committee for War, which will assist with the fuel saving program now centered in the WPB and OWI Critical Resources Campaign.

◆

W. G. McFadden, formerly Assistant District Sales Manager of the **Allegheny Ludlum Steel Corporation's** Chicago Office, has been appointed District Manager of that territory, according to R. M. Allen, Vice President in Charge of Sales.

Mr. McFadden was named Acting Manager in the Chicago territory when P. E. Floyd was granted a leave of absence to serve the government on the War Production Board. Mr. Floyd has since assumed new duties as Assistant General Manager of Sales at Brackenridge, Pa.

◆

The Milcor Steel Company, Milwaukee 4, has made three appointments affecting its future sales activities, according to an announcement issued by **E. A. Tanner**, President.

Effective at once **C. G. Wollaeger** is Vice President in Charge of Sales, **W. P. Schwarm** is Sales Manager and **E. J. Cullen** is Manager of Sales of Sheets and Roofing Products.

W. B. Turner will continue as Manager of Sales of the Fireproof Materials Division and **G. H. Schneider** as Manager of Sales of the Heating and Ventilating Division.

During the past two years the output of the Milcor Steel Company has been devoted almost entirely to materials for the war effort. Management at the present time is actively planning its post-war business and the new sales appointments are in line with those plans.

◆

Sewell H. Downs, for 20 years chief engineer of the Clarage Fan Company, and a nationally recognized authority in the air conditioning and air handling field, was elected president of the American Society of Heating and Ventilating Engineers, at this organization's annual convention in New York City, Monday, January 31.

The American Society of Heating & Ventilating Engineers is made up of about 3500 key engineers employed in industrial plants, and in consulting capacities. Mr. Downs became a member of the Society in 1931. He was placed on the Society's Council in 1936, a position he still retains. He was named second vice-president in 1942, and first vice-president in 1943.

The selection of Mr. Downs for the presidency, the association feels, comes as recognition for his outstanding achievements in both research and application in the air conditioning field.

Louis Narowetz — Died March 12

LOUIS NAROWETZ, first son in a family of five children, was born October 28, 1866, at Styer in the Black Mountains of Central Europe. At an early age, as was then customary, he was apprenticed to an uncle who operated a millright and metal working shop. Following his training as a mechanic and on completion of his primary schooling, he served his time with the military. Upon his qualification by his master as a Journeyman and after working for one year in various shops all over Europe, he received his "apron"—symbolic of reaching full status as a mechanic.

With a fine, sturdy physique, he was in line, on reaching his majority, to serve in a "Guard" regiment—first step to a military career, but his employer, sensing his mechanical ability, advised him to, and arranged for his passage to America. Arriving in 1887, and coming to Chicago, he at once took up night school and in a few years was eligible for citizenship.

In 1889 he married Mary Kristan and from this union four daughters and one son were born—all of whom are still living. Eight grandchildren and one great grandson are living.

After working in several shops, he entered the employ of George E. Dixon who, at that time, was the largest heating and ventilating contractor in the Chicago area. His industry and aptitude soon brought recognition and the job of superintendent of sheet metal workers and pipe fitters. In the meantime, he was one of the organizers and charter members of Local No. 73, Amalgamated Sheet Metal Workers Union, with which organization he enjoyed a life-long association of confidence and respect.

During his long life, even after he had become one of Chicago's best recognized sheet metal employers, Mr. Narowetz was an earnest advocate of more human relationships between employer and employee. He firmly believed that only through organization could the employee protect himself and obtain those "inalienable rights" each citizen is guaranteed. Each social advance was, to Mr. Narowetz, not something for the employer to view with skepticism, but the right of every decent American. Unemployment compensation, sickness benefits, old age insurance were, to this loyal citizen, natural social advances.

His connection with the Dixon company and the contacts he made with architects and engineers while installing work in such buildings as Wanamakers in Philadelphia, Frick Building in Pittsburgh, Railway Exchange, First National Bank, Heyworth Building, Marshall Field & Company and many other large structures completed at the turn of the century, stood him in good stead when he embarked on his own business on 1903.

Following his first brief venture with two partners, he organized his own business and contracted the ventilating work in such structures as the Commonwealth Edison, Illinois Bell Telephone, Sears Roebuck. His ambition to be a leading contractor was realized when, in 1910, he completed his then largest contract—in the Hotel Sherman. This was quickly overshadowed by the contract he always considered his masterpiece—the Chicago & Northwestern Railroad station in Chicago.

As a master mechanic, he was always interested in better equipment and produced many inventions—his Little Niagara air washer was probably the best known and is now serving in many of the country's largest buildings.

In 1935 his career as an employer was climaxed by his election to the Presidency of the Building Construction Employers' Association, in which capacity he served for three years. On completion of his term in office, Mr. Narowetz retired from active management of his business but his lifelong interest in mechanics was evidenced in his home workshop where as a woodcarver, gunsmith, machinist, metal worker and all around mechanic, he loved to work with the tools he made in Europe as an apprentice augmented by modern wood and metal working machines.

UTILITY
Evaporative
COOLERS
Utility Evaporative Coolers are now available on AA5 or better priority without authorization from WPB, with certain exceptions.
Coolers may be stocked for inventory or re-sale by obtaining approval from War Production Board on Form WPB-547 (PD-1X).
For exceptions and complete information, consult your local WPB office and ask for Order L-38 as amended December 6, 1943.
UTILITY FAN CORPORATION
Peace-Time Manufacturer of Famous Utility Air Koolers, Blowers, Fans, Floor Furnaces, Circulating Heaters, Unit Heaters, and Forced Air Furnaces.
4851 S. Alameda, Los Angeles 11, Calif.

★ ★ ★ SPECIAL ★ ★ ★

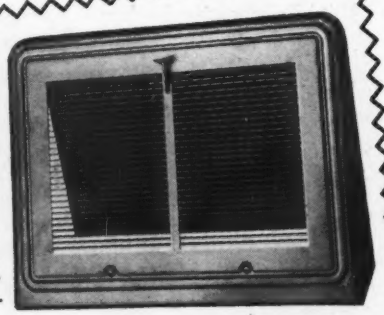
US NEWS!

U. S. REGISTER CO. MARCH 1944

REGISTER MANUFACTURE COMBINED WITH WAR PRODUCTION

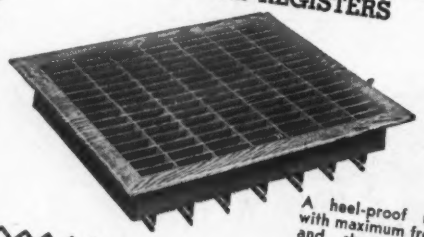
BATTLE CREEK, MICHIGAN. All production facilities of the U. S. Register Co. not on direct war production are busy making registers as fast as steel comes through. We've kept our equipment intact . . . and working! We're ready to hit peak production the minute restrictions lift.

Now—when Register stocks are Low—SHIFT to U. S. for the most Modern and Popular in Registers, Faces, Grilles and complete requirements for Gravity and Air Conditioning Installations! Peace will find you ahead of the field!



No. 40 SERIES
GRAVITY BASEBOARD REGISTERS
Today's finest of Registers—least resistance, leakproof, with removable face.

No. 400 TRUSSTEEL FLOOR REGISTERS



A heel-proof register with maximum free area and short-way vanes for cleaner walls.

UNITED STATES REGISTER CO.
BATTLE CREEK, MICHIGAN
MINNEAPOLIS • KANSAS CITY • ALBANY

Stoker Service Refinements

(*Continued from page 57*)

stoker that so materially affect the operation that they should be noted.

Hearth

The hearth should be such that it gives ample room for clinkers. It should be flat and level, and certainly not dished down towards the retort. It should be from 1″ to 2″ below the top of the retort, depending on the recommendation of the manufacturer for the particular retort. The width of the clinker space around the retort should be at least one-half of the diameter of the retort. It is permissible to cut this down on two sides when the boiler or furnace is narrow provided there is ample room on the other two sides. However, in such a case the home owner should be cautioned to use extra diligence in removing clinkers from the sides having the restricted clinker space.

On the other hand if the hearth area is too great unsatisfactory combustion may result, such as a mushroom or star-fish bed burning at the edges with green coal at the center. This is ordinarily encountered only in long rectangular fire boxes and is readily corrected by building a bridge wall six to eight inches back of the retort.

Headroom

Most stoker manufacturers give the recommended minimum headroom they prefer to see used with each size of stoker. However, it is now generally recognized that this should not be a hard and fast rule. It is far better to assume that the hearth should be set at the former grate level, provided the boiler or furnace is of an accepted standard make.

The pitting of stokers with the consequent lowering of the hearth below the water legs of a boiler is probably as contributory to poor operation as any other one thing.

In the first place it had been proven several times that lowering the fire below the water walls results in decreased efficiency. This looks reasonable since the water walls are not in as advantageous a place to absorb heat. Rather the heat goes to the refractory walls in such a case. These walls become red hot and waste some heat by radiation out through the boiler base. Still worse these hot walls reflect heat down upon the retort. Excessive fire box temperatures result, causing clinkers to adhere to the walls and hearth. Often under such conditions the clinkers will become so fluid as to run down into the retort.

Also when a hearth is built below the water legs there is an exaggerated tendency to protect the water legs with a two or three inch wall of refractory. This in turn cuts down the hearth area and the room for clinkers. In case a retort has been put down in such a hot place it will often get red hot as can be witnessed by uncovering it when there is a hot fire. Under such conditions clinkers are very likely to adhere to the retort and that in turn puts an undue load on the stoker. Yet the trouble that results is often blamed on the stoker or the coal whereas it is in reality the fault of the installation.

Noise

There are of course many things that cause a

MEN ON A MISSION . . .

The mission is . . . *crushing defeat of Axis terrorists on their own shores.* And every move we make at PAYNEHEAT today is designed to hasten that result! ★ When Victory comes, we'll again turn our "Paynes-taking" workmanship to *furnaces,* featuring . . .

Payne ZONE-CONDITIONING

Post-war successor to the central furnace! Quick, clean gas heating and fresh air circulation, *controlled by zones or individual rooms.* ★ Every family that builds or remodels will be a Zone-Conditioning "prospect" for PAYNE Dealers. ★ But now, let's back those *men on a mission* in every way we can! Buy more War Bonds.

GAS FUEL (HAS) EVERYTHING

PAYNEHEAT

NEARLY 30 YEARS OF LEADERSHIP

U. S. Signal Corps Photo

Payne FURNACE & SUPPLY CO., INC., BEVERLY HILLS, CALIFORNIA

The PRODUCT behind this *Trade-mark*

PEXTO

DOUBLE SEAMING MACHINES

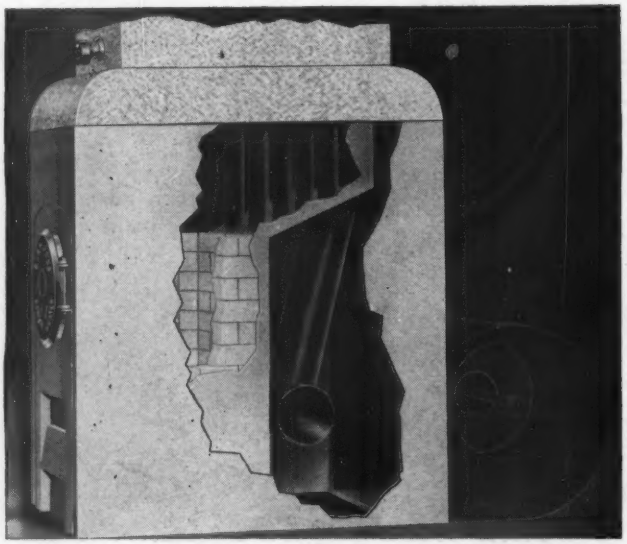
When a product is in popular demand after 158 years—that's something.

The "something" is an experienced knowledge of the Sheet Metal Workers' problems . . . and mechanical vision in building the tools and machines to exacting needs.

THE PECK, STOW & WILCOX COMPANY SOUTHINGTON, CONNECTICUT, U. S. A.

Now available!

BERTOSSA POWER HEATERS IN LIMITED QUANTITIES TO QUALIFIED DEALERS....



Bertossa heating units for the past 2½ years have been supplying heat and air conditioning to navy bases, army camps and war plants.

But government requirements today have largely been filled. A limited supply of Bertossa Heating units are now available on priority to accredited dealers.

Leading engineers and architects have long appreciated the efficiency of Bertossa heating units. Built in a wide range of sizes from 150,000 to 2,800,000 B.T.U.'s, Bertossa units have an unusually compact arrangement of blower and heating unit. They have a unique type of down draft flue. They have 90% direct heating surface, and they can be easily adapted to complete air conditioning.

Your territory may be open—write us today.

BERTOSSA

Manufactured by JACKSON & CHURCH CO.
SAGINAW, MICHIGAN

stoker to be noisy within itself. For example, an improperly mounted motor, an unbalanced fan, etc. These are obvious things. However, if a stoker is properly designed and assembled it still has some vibration to it. If, then, it is installed so as to amplify this vibration the volume of noise may become very objectionable.

The first rule then for installing so as to minimize noise is to keep the stoker from actual contact with the boiler, or pipes, or walls, or even with the electrical conduit. The stoker proper should set on rubber or cork. The retort should set on an asbestos pad. Asbestos should be used between the brick and the windbox when bricking up the entrance to the boiler base. There should be at least a short piece of BX between the motor and the electrical conduit.

◆

Sub-Floor Heating to Reduce Floor-to-Ceiling Temperature Differance

(*Continued from page* 63)

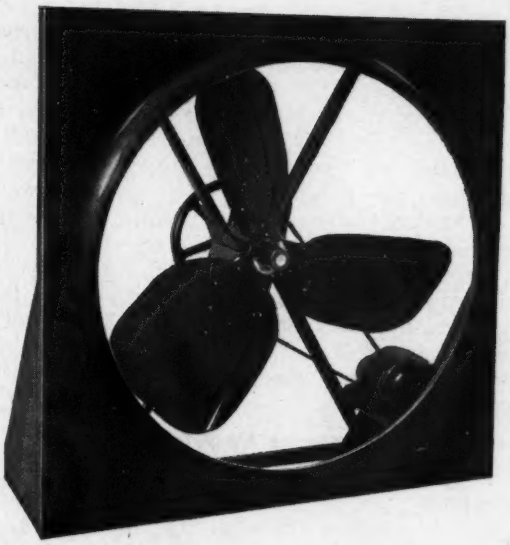
86°, the temperature gradient of air in the living room was practically eliminated. Floor surface temperatures were just slightly less than the temperature of the inside air. A high floor surface temperature not only reduces radiation of body heat; it reduces conduction of body heat from the feet.

The amount of moisture in the inside air has some effect on comfort since the body loses a large part of its heat by evaporation. Scattered relative humidity readings taken during the subfloor heating tests showed a slight increase in the moisture content of the inside air over that existing during normal heating.

Sub Floor Heating Has Future

The data recorded during this study, although far from conclusive, indicate that subfloor heating may be economically feasible and that it does make a definite contribution to the comfort condition of a house. This tentative proposition is supported by correspondence received from several technicians in the United States and in England, commenting on the TVA report on *Heating at Norris, Tennessee*, and stating their favorable experience with subfloor or floor panel heating. The subject appears to be especially significant for occupants of houses without basements.

Other correspondents have called attention to successful use of low-speed ceiling fans to accomplish the same purpose of uniform distribution of air temperature. It is recognized that mechanical circulation has been found satisfactory. The purpose of the present experiment was to try an alternative method, one that would avoid perceptible air movement and retain the advantages of silence and radiant effect, which are enjoyed with the type of equipment now installed in electrically heated TVA houses. This method can also be used with steam and hot air heating.



. . . for
BETTER WORKING CONDITIONS
. . . to
IMPROVE PLANT EFFICIENCY

LAU Industrial and Commercial Fans

LAU propeller type air circulating fans have many applications for maintaining constant temperatures—providing fresh air in confined enclosures — removing stale, excessively hot, or dust-laden air; fumes; smoke; etc. Available on priority ratings for reasonably prompt delivery. Plan your requirements ahead. Now is the time to schedule summer installations.

FURNISHED IN 5 DIAMETERS

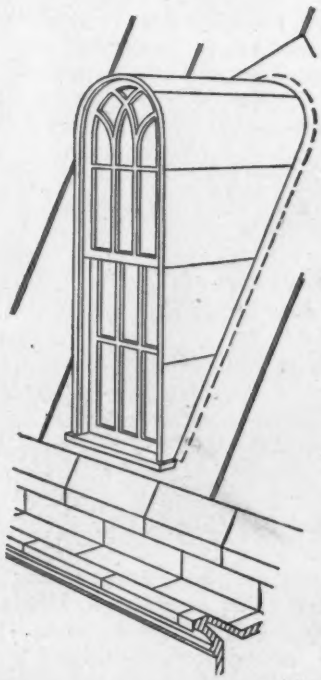
Fan Size	C.F.M.	H.P.
22"	3,800	1/6
30"	7,100	1/4
36"	9,000	1/4
36"	10,150	1/3
42"	11,300	1/4
42"	12,600	1/3
48"	15,050	1/2
48"	18,000	3/4

Write us direct or contact your nearest jobber.

THE LAU BLOWER COMPANY
DAYTON 7, OHIO
WORLD'S LARGEST MANUFACTURERS OF FURNACE BLOWERS

Engineers and fabricators of general Air Handling Equipment
Single Inlet and Double Inlet Blowers • Propeller Fans • Accessories

Easier to handle



FOLLANSBEE

Seamless Terne Roofing

Made in 50 and 100 foot rolls, Follansbee Seamless Terne Roofing is easy to handle in the shop and on the job. Quickly cut to desired lengths which entirely eliminate cross-seaming and simplify installation. Made with uniformly straight edges and free of buckles—no field trimming is necessary to correct for camber. Ease of handling is one of four exclusive advantages of Follansbee Seamless Terne Roll Roofing.

FOUR EXCLUSIVE FEATURES:

1. Easier to Handle
2. Saves Time and Materials
3. More Durable, Less Maintenance
4. Smooth, Improved Appearance

Now available for essential maintenance and repair in 8 pound coating. Order through your local jobber or the nearest Follansbee office or agent.

FOLLANSBEE STEEL CORPORATION
GENERAL OFFICES • PITTSBURGH 30, PA.

Sales Offices—New York, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, St. Louis, Nashville, Los Angeles; Toronto and Montreal, Canada. *Plants*—Follansbee, W. Va. and Toronto, Ohio.

ELECTRICAL SHEETS & STRIP • ALLOY BLOOMS, BILLETS, BARS, SHEETS & STRIP • COLD ROLLED SHEETS & STRIP • POLISHED BLUE SHEETS • SEAMLESS TERNE ROLL ROOFING

Neubecker — Transition Elbow

(*Continued from page* 66)

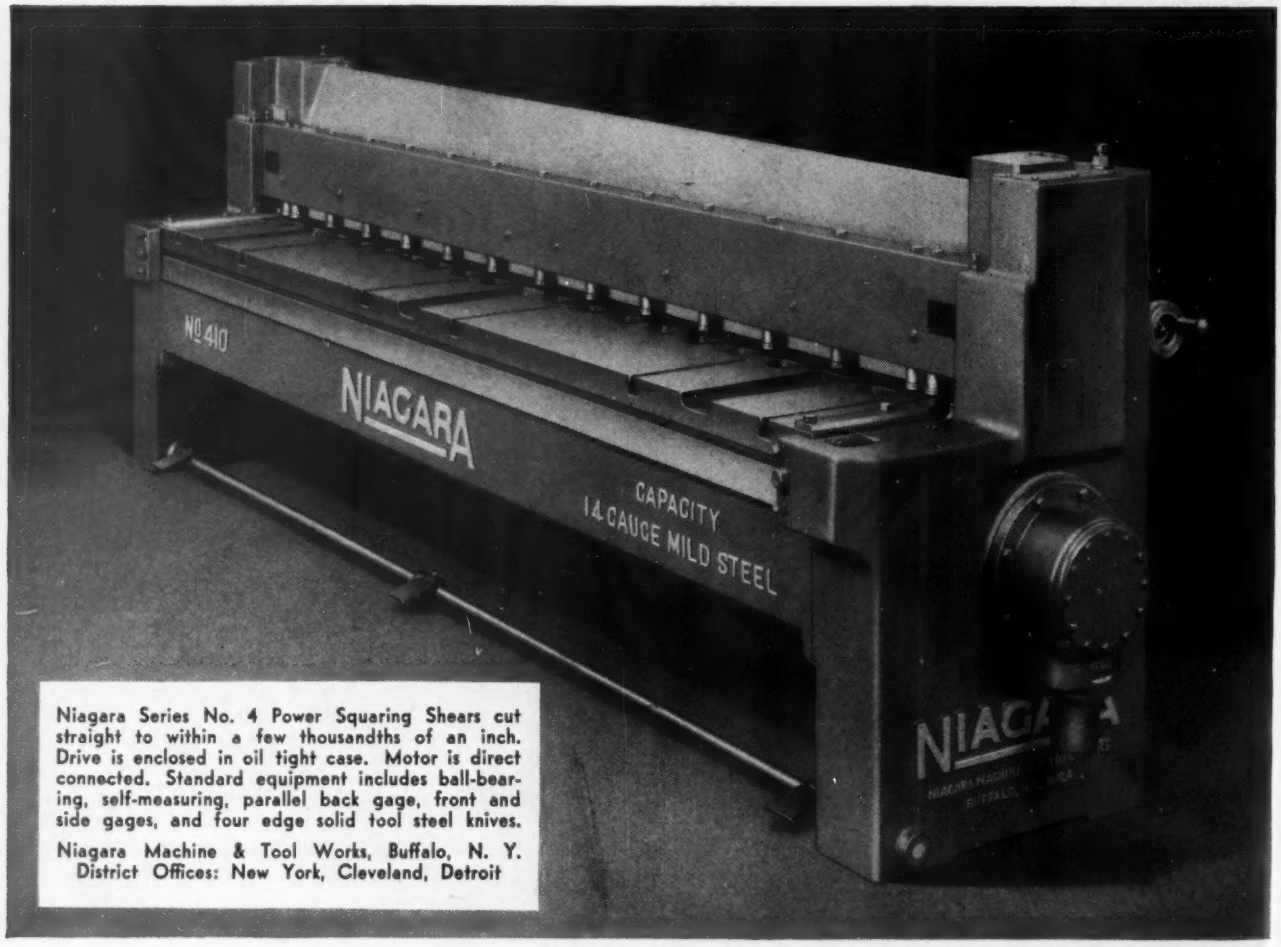
found in a similar manner as shown in the true lengths of dotted lines in diagram S. For example, to find the true length of the dotted line *4°-14°* in piece II°, take this distance and set it off on the vertical line *17-7* in diagram S as shown from *4°* to *14°*. From these two points draw right angular lines, making *4°-4* and *14°-14* equal respectively to *4°-4* and *14°-14* in the lower and upper half sections in piece II°. Draw the dotted line *4* to *14* in diagram S which gives the desired true length. In this manner all of the true lengths of dotted lines shown in piece II° are obtained as shown by similar numbers in diagram of true lengths S.

The true lengths of both solid and dotted line shown in piece III° are indicated in the true length diagram T. The altitudes or heights on the various points on the line *8-17* in piece III° are obtained from the upper half section in piece II° because the divisions on the line *8-17* in both pieces II° and III° are similar. The altitudes or heights on points *18°* and *19°* in piece III° will be equal to either *18°-18* or *19°-19* shown in the upper half section of the rectangular duct. For example, to obtain the true length of the solid line *12°-19°* in piece III°, set off this distance on the vertical line *18°-8* in the true length diagram T as shown by the points *12°* and *19°*. From these two points draw the right angular lines *12°-12* and *19°-19* equal respectively to *12°-12* in the upper half section of piece II° and *19°-19* in the upper half section of piece III°. The solid line drawn from *12* to *19* in true length diagram T will be the true length of *12°-19°* in piece III°.

To find the true length of the dotted line *14°-18°* in piece III° set off this distance on the vertical line *18°-8* in diagram T as shown by the points *14°* and *18°*. From these two points draw the right angular lines *14°-14* and *18°-18* equal respectively to 14°-14 in the upper half section in piece II° and *18°-18* in the upper half section in piece III°. Draw the dotted line *14-18* in diagram T which will be the desired true length. In this manner the balance of all the true lengths of solid and dotted lines in piece III° are obtained; as shown by similar numbers in the true lengths diagram T.

Half Patterns by Triangulation

Having found the true lengths for both pieces II° and III°, the patterns can now be developed. To lay out the pattern for piece II°, take the distance from *7* to *8* and set it off on any vertical line in the half pattern for piece II (which has been designated U) as shown from *7* to *8* From *8* draw the right angular line *8-9* equal to *8-9* in the upper half section of piece II°. Draw a line from *9* to *7* in half pattern U which will, of course, be equal to *9-7* in the true length diagram R. Now with *9-10* in the upper half section in piece II° as radius and using *9* in pattern U as center, draw a short arc near *10*, which intersect by an arc struck from *7* as center with a radius equal to the dotted true length *7-10* in the true length diagram S. Now with *7-6* in the lower half section of piece II° or *7°-6°* along the miter cut in the half pattern for piece I as radius (both divisions being sim-



Niagara Series No. 4 Power Squaring Shears cut straight to within a few thousandths of an inch. Drive is enclosed in oil tight case. Motor is direct connected. Standard equipment includes ball-bearing, self-measuring, parallel back gage, front and side gages, and four edge solid tool steel knives.

Niagara Machine & Tool Works, Buffalo, N. Y.
District Offices: New York, Cleveland, Detroit

ilar) and using *7* in pattern U as center, describe a short arc near *6* and intersect it by an arc struck from *10* as center, with a radius equal to *6-10* in the true lengths in diagram R.

Proceed in this manner using, alternately, first the proper numbered division in the upper half section in piece II°, then the proper numbered true length of the dotted line in the true length diagram S; the proper numbered division in the lower half section of piece II°, or the proper numbered division along the *miter cut* in pattern for piece I (both divisions being similar), then the proper numbered true length of solid line shown in the true length diagram R, until the line *16-1* in pattern U has been drawn.

Then using *1-17* in II° (its true length) as radius and *1* in pattern U as center, describe a short arc near *17* and intersect it by an arc struck from *16* as center with *7-16* in the upper half section in piece II° as radius. Draw lines in pattern U from *1* to *17* to *16*, also from *13* to *12* and trace the curved lines from *1* to *7*, *9* to *12* and *13* to *16*. Then will *1-7-8 17-1* be the one half net pattern for piece II in side elevation.

The half pattern for III in side elevation or III° at the lower left, is shown and designated by V and is developed as follows: Take the distance *8-19°* in III° and set it off on the vertical line as shown by *8-19°* in pattern V. From these two points *8* and *19°* in V draw the right angular lines *8-9* and *19°-19* equal respectively to *8-9* in the upper half section in piece II° and *19°-19* in the upper half section in piece III°. Draw a line from *9* to *19* in pattern V, which will be equal to *9-19* in the true length diagram T. Now with radii equal to *19-10*, *19-11* and *19-12* in the true lengths in diagram T and using *19* in pattern V as center, draw short arcs near *10*, *11* and *12*. Now set the dividers equal to the divisions *9* to *10* to *11* to *12* in the upper half section of piece II° and starting from point *9* in pattern V step to arcs *10*, *11* and *12* Draw a line from *12* to *19*. With *19°-18°* in the upper half section in piece III° as radius and using *19* in pattern V as center, draw a short arc near *18* and intersect it by an arc, struck from *12* as center with a radius equal to *12-18* in the true length diagram T.

Now with *12°-13°* in piece *III°* or *12-13* in the upper half section in piece II° (both being similar) as radius and *12* in pattern V as center, draw a short arc near *13*, which intersect by an arc struck from *18* as center with a radius equal to *18-13* in the true length diagram T. Draw lines in pattern V from *19* to *18* to *13* to *12*. With radii equal to *18-14*, *18-15* and *18-16* in the true length diagram T and using *18* in pattern V as center, draw short arcs near *14*, *15* and *16*. Now set the dividers equal to the distances *13* to *14* to *15* to *16* in the upper half section of piece II° and starting from *13* in pattern V, step to arcs *14*, *15* and *16*. Draw a line from *16* to *18*. With *18-18°* in the upper half section in piece III° as radius, and *18* in pattern V as center, draw a short arc near *18°* and intersect it by an arc struck from *16* as center with a radius equal to *16-18°* in the true length diagram T. With *16-17* in the upper half section of piece II° as radius and *16* in pattern V as center, draw a short arc near *17* and intersect it by an arc struck from *18°* as center, with a radius equal to *18°-17* in piece III°. Draw lines in pattern V from *16* to *17* to *18°* to *18*, also curved lines through the intersecting points from *9* to *12* and *13* to *16*. Then will *8-17-18°-19°* be the one-half net pattern for piece III in side elevation.

Allow edges on patterns for I, II, III and IV for seaming. The dots shown on the solid lines in both

THE DIVIDENDS of DEPENDABILITY

Comfort-

ACCURATELY CONTROLLED

An A-P OILIFTER, automatically lifting oil from bulk storage in basement or outdoors, feeding it in measured quantity for the requirements of the heater, means quick, easy heating comfort for thousands of Americans today.

The standard A-P Constant Level Oil Control Valve, illustrated next to the OILIFTER, is standard equipment on most of the leading oil burning heaters. It may be manually operated, or controlled through a thermostat.

All A-P Oil Controls and accessories are precision-built to the highest standard of dependability. They offer accurate oil control, heating economy, and steady service-free efficiency that adds much to the satisfaction of your buyer.

Continuing research and development now in progress at A-P laboratories will offer many more advantages—"dividends"—of A-P control-knowledge in post-war appliances. Watch for them—for new selling aid in peacetime heaters and other products.

AUTOMATIC PRODUCTS CO.

2452 N. Thirty-Second St., Milwaukee 10, Wis.

Dependable OIL CONTROL VALVES

WHITNEY-JENSEN PRODUCTS
30 YEARS EXPERIENCE

Nos. 7, 7½, 8—Imperial
ROLLER BEARING PUNCHES

Improved lever-type eccentric-action punches made easy-working by roller bearings. Will punch and strip positively inside 90° for quick, clean, accurate work.

Easy to change punches and dies. Capacities: (No. 7) ¼" hole in ⅜" iron; (No. 7½) ¼" hole in 3/16" iron; (No. 8 Imperial) ¼" hole in ¼" iron.

NEW! No. 38 BENCH SHEAR

A small, powerful, throatless-type shear with capacity up to 3/16" mild steel. Cam action provides straight up-and-down blade travel.

Length of blade 5". Size, overall, 11"x 8¾"x7½". Weight 45 lbs. All parts interchangeable for easy replacement. Write for Circulars.

WHITNEY METAL TOOL COMPANY
91 FORBES ST. • ROCKFORD, ILL.

WILL WILLIE WILLIAM BILL

4 Little "Fitting" Guys Fighting For You!

Will cuts installation costs—Willie makes fittings fit—William keeps prices down to bed rock—and Bill sees that there is stock near you.

FLASH NEWS! Complete, simplified line Gravity Pipe and Fittings now available on rated orders—24 hour service and shipments.

FREE: Complete, easily understood gravity pipe and fittings catalog showing full simplified line. Write Dept. 2 for prices and catalog.

THE WILLIAMSON HEATER COMPANY
CINCINNATI 2, OHIO

WILLIAMSON
WARM AIR FURNACES

patterns U and V indicate where slight bends must be made at inclinations shown by the shaded sections in both half pattern shapes. If the elbow is of such a size that the patterns can be made in one piece, then simply reproduce the patterns shown by U and V opposite the center line mark C. L.

◆

Wisconsin Convention

(*Continued from page* 83)

past four or five years would be complete without some reference to the "hospitality" room. Financed by contributions, Wisconsin hospitality room has concentrated good fellowship in a centralized entertainment and has proved one of Wisconsin's outstanding successes. Finally, this year's concluding banquet was certainly up to Wisconsin's standard for food and members and their ladies were entertained by a very interesting program of vaudeville acts.

◆

Konzo—Checking Warm Air Pipes

(*Continued from page* 56)

writer for a copy of Circular 45. Every step in the derivation is based on test results. No other form of heating system, bar none, has as complete an analysis available.

◆

Your Manpower Problems

(*Continued from page* 41)

get the go-ahead sign until it is certain the war is on its way to being won.

Our problem, in 1944, then, is to "mark time" if we are not in actual war work—doing as best we can, as much as we can, to keep the American homeowner comfortable and healthy; to keep American industry operating; to keep American business going.

◆

URCA Convention

(*Continued from page* 75)

of Sales, Barrett Division, Allied Chemical & Dye Corporation, enlighted the industry audience with a graphic description of the enormous part played by the roofing industry in aid to the war effort.

At the election of officers and directors the following candidates were unanimously elected for one year:

President—A. L. Biebel, Art Biebel, Inc., East St. Louis, Ill.

1st Vice-President—C. C. High, Elkwood Company's, Harrisburg, Pa.

2nd Vice-President—Ben J. Esko, Esko Roofing Co., Chicago, Ill.

Secretary-Treasurer—Wilson S. Pennock, Atlas Roofing Co., Chicago, Ill.

Directors elected included: M. T. Buckley, Wichita, Kans.; Mark Cronin, Chicago; T. J. Daly, Kansas City, Kans.; Iver J. Erikson, Worcester, Mass.; R. B. Gause, Elkhart, Ind.; J. Boyd Griffiths, Binghamton, N. Y.; J. J. Hession, Louisville, Ky.; Geo. B. Hinman, Lincoln, Nebr.; H. J. Kroeger, Milwaukee; Lester E. Lambert, Salt Lake City; I. A. Langer, Milwaukee; Howard W. Laws, Hono-

lulu, Hawaii; Leonard Martin, Kansas City, Kans.; Jos. E. Mattingly, Indianapolis, Ind.; W. A. Moffatt, Toronto, Ont., Canada; J. A. Piper, Greenville, S. C.; Myron W. Powell, Chicago; B. D. Schramm, Denver, Colo.; W. C. Schroeder, Cleveland; W. B. Seaman, St. Joseph, Mo.; Gordon Waters, Rocky Mount, N. C.; Ray Semmler, Detroit; Peter Rookus, Bay City, Mich., and Irving Prickett, Philadelphia.

◆

Barometric Dampers

(*Continued from page* 61)

really over-loaded by timing the burner to see what proportion of any four-hour period the burner is in service. No burner should run more than three-fourths of the time during any four-hour period.

If there is insufficient combustion space, it may also be necessary to have a very strong draft to avoid smoke, and perhaps no control should be installed. Last of all, if there is a very long run of smoke pipe or breeching and a short stack or if the chimney is poor, it would be better not to install a control.

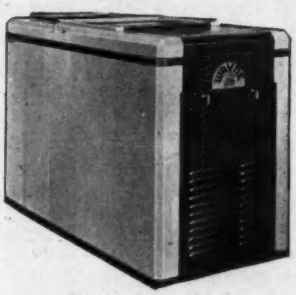
◆

Elof R. Leonard, 80, Bethesda, Md., once a well-known sheet-metal manufacturer in Washington and New York, died recently of a heart attack.

As owner of the Leonard Sheet Metal Co. of Hoboken, N. J., Mr. Leonard had worked on many private and Government buildings in New York and Washington. He had charge of the metal work on the Walsh house on Massachusetts avenue and Theodore Roosevelt's home at Oyster Bay, Long Island. He also worked on the Capitol, the Government Printing Office and other Government institutions.

Besides his daughter, he is survived by a son, Theodore R. Leonard of Paterson, N. J.

WAYNE OIL-FIRED



FURNACE UNITS

60,000 to 400,000 B.T.U.

PROMPT SHIPMENT

on proper priority

The complete line of Wayne oil-burning furnaces and burners is again available.

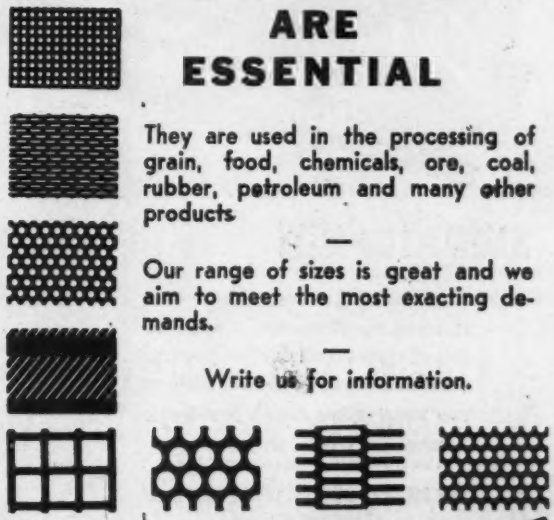
WAYNE OIL BURNER CO., 913 Glasgow Avenue
Fort Wayne 4, Indiana

WAYNE'S V-DAY LINE WILL BE COMPLETE

OIL-FIRED, GAS-FIRED, COAL-FIRED FURNACES, STOKERS, BOILERS, WATER HEATERS. CONVERSION BURNERS FOR OIL AND GAS.

LINE UP WITH WAYNE FOR POST WAR PROFITS

PERFORATED METALS ARE ESSENTIAL



They are used in the processing of grain, food, chemicals, ore, coal, rubber, petroleum and many other products

—

Our range of sizes is great and we aim to meet the most exacting demands.

—

Write us for information.

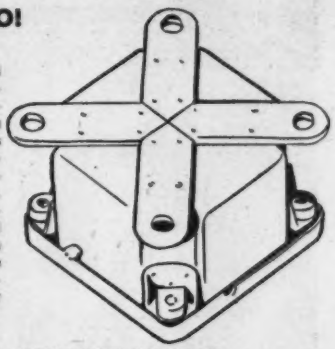
The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago 44, Ill. and 114 Liberty St., New York, 6, N. Y.

NOW . . . Spot Weld 2.4 Times Faster like this Cleveland Mfr.

YOU, TOO, MAY CUT OPERATIONS FROM 34 TO 15 . . . OFF-TIME FROM 29 TO 14 SECONDS . . . AND GET BETTER WELDS, TOO!

Spero Electric Co., making 98 Steel Enclosures from low carbon steel stampings to Maritime Commission specifications, found from actual production figures they were taking 2.34 minutes to weld with projection dies on a Universal Model J Spot Welder what normally takes 5.38 minutes to spot weld. Result: Number of operations were reduced more than half; lost time reduced more than half; and total production speeded nearly 2½ times. Investigate today the possibilities for adapting projection techniques to your work. It may profit you and will cost you nothing.



PUT THE STRENGTH WHERE YOU WANT IT!

Illustration shows result of simple tear test you can make on your own vise. Weld was made with projection die on Universal Model J Welder. The base metal failed but the weld nugget held. You may get this type results faster and cheaper than you are now by using projection techniques. Call on us for our help. Tell us the particulars of your job. We will offer our recommendations at no obligation.

UNIVERSAL WELDERS

SEND COUPON TODAY

UNIVERSAL POWER CORP., 4898 Euclid Ave.
Cleveland 3, Ohio.

Please send complete story on your Spot and Projection Welders and accessories and how they can help me. Paste coupon on letterhead.

NAME .....

ADDRESS .....

CITY..... STATE.....

It's Customer Satisfaction that brings in the low-sales-cost repeat jobs...

Build Prestige with

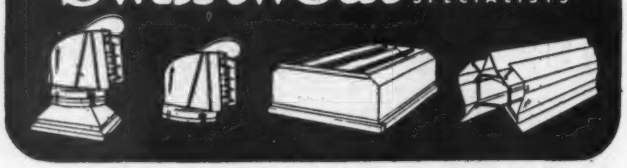
SWARTWOUT ROOF VENTILATORS

for industrial & commercial ventilating requirements. Complete line of styles & sizes gives you the scientifically designed ventilators you need to handle all problems.

Write for Bulletin 214 showing the Swartwout Ventilator Line.

THE SWARTWOUT CO., 1851l Euclid Ave., Cleveland 12, Ohio

Swartwout VENTILATION SPECIALISTS



Syncromatic

— THE FINEST —

STEEL FURNACES

GRAVITY

FORCED AIR

COAL — OIL

FIRST IN

ECONOMY
SAFETY
BEAUTY
PERFORMANCE
SIMPLICITY

IF YOU WANT TO KEEP AHEAD
ASK YOUR JOBBER FOR INFORMATION
OR WRITE

Syncromatic Corporation
MILWAUKEE (12), WIS.

Amendments, Interpretations

(*Continued from page* 45)

tool beyond five. Under the revised order, the inventory limit is raised to eight tools of each size and type for dealers in the following 17 states:

Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas.

The inventory limitation of five light power-driven tools continues for dealers in other states.

Other changes in Order L-237 include:

1. A producer or supplier (dealer) will require an order bearing a preference rating of AA-5 or better in order to sell or deliver a light power-driven tool. The previous rating requirement was A-1-a.

2. The provisions restricting the quantity of light power-driven tools a producer may manufacture is changed. The simpler control formula used in the wood working machinery order (L-311) is substituted for the previous provisions based on anticipated orders, or a percentage of 1941 sales.

3. Paragraph (b) (3) of the order is revoked. As a result, with the exception of nine types of tools which now appear on the new List B of Priorities Regulation 3 (no tools commonly used by our industry) the tools controlled by this order may now be sold on ratings assigned by CMP Regulations 5 and 5A, covering maintenance, repair and operating supplies. (MRO).

◆

Aluminum Released for MRO

RULES governing maintenance, repair, and operating supplies, (MRO) under the Controlled Materials Plan were modified Feb. 26 to make it possible for persons desiring to purchase *aluminum* for MRO purposes to obtain it in the same manner that steel and copper in controlled materials forms and shapes are obtained.

In addition, the limit of 100 pounds of aluminum for MRO purposes that formerly applied has been eliminated. Under the new rules (CMP Regulation No. 5, as amended February 26, 1944), the only limit on amounts of aluminum that may be bought by a person eligible to use the MRO symbol for the purchase of controlled materials is the purchaser's MRO quota.

The procedure that formerly applied required that a special form of certification had to be used by persons purchasing aluminum under the MRO regulation. This is no longer necessary. Under the new procedure, persons purchasing aluminum for MRO purposes need no longer certify that the use of other materials would be impracticable and that the total amounts of aluminum on order do not exceed 100 pounds for the calendar quarter in which delivery of the order is requested.

The amended order also provides that if an appeal for an increased MRO quota has been granted by the War Production Board, the increased quota may be used for operations during quarters subsequent to the one for which it was originally granted.

This rule holds unless a substantial part of the increased quota was granted to take care of an abnormal situation. For example, where a person's quota

has been increased to permit him to purchase a large amount of special tools and equipment to produce a new product, the increased quota may not be used in quarters subsequent to the one for which it was originally granted.

The amended regulation points out that persons who use its provisions to obtain MRO materials must compute their MRO quotas and must maintain a record of them on file. In addition, records of expenditures against the quota must also be maintained. As a result, Direction No. 13 to CMP Regulation No. 5, which formerly required that quotas be computed, has now been revoked in view of the fact that the provisions are now spelled out in CRM Regulation No. 5 itself.

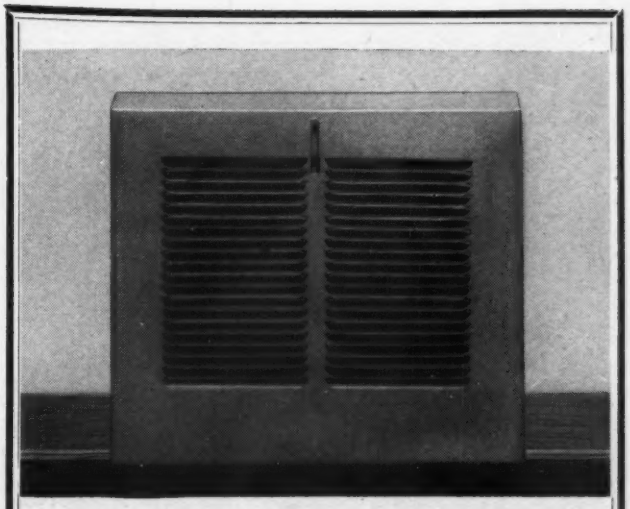
◆

New 1319 Form

IN AN effort to save paperwork and time in the handling of applications for authorization to purchase or deliver equipment, the War Production Board announces the approval of a new and standardized form to take the place of the 20 that previously covered 52 items of equipment.

The new form to be known as WPB Form 1319, will supplant the old variations of WPB Form 1319, as well as many others and will cover the entire field with the exception of those coming under the head of the old PD-1A and PD-3A, which are applications for certain preference ratings.

The new form, covering four pages, will have the same places of filing, same number of copies, and same methods of processing as the present forms.



The New **EFFECTO-GRILLE Gravity REGISTERS and GRILLES**

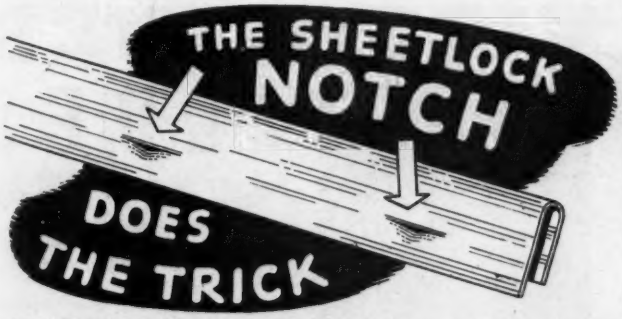
Efficient and Beautiful
PRICED WITH THE LOWEST

Meets F.H.A. specifications as to ample FREE AREA. Adaptable to forced air installations.

PROMPT DELIVERY

Write for Price List and Folder

EFFECTO-GRILLE COMPANY
9930 Freeland, Detroit 27, Michigan



IN FABRICATING NON-METAL DUCTS

The notches run continuously along the length of Sheetlock Strip and grip and hold the sheet board firmly and securely. Simply push the board into the Sheetlock channel. The notch does the rest. No nails, bolts or screws required.

However, strapping should be used in fabricating ducts from heavy asbestos board. The Sheetlock notched strip holds the duct together while the strapping is being applied.

ANGLE SHEETLOCK
No. 10 for ⅛" Board
No. 11 for 3/16" Board
No. 12 for ¼" Board

Cement or caulking compound is unnecessary because the lip of the strip is held tight against the sheetboard thru spring action.

Sheetlock is also used in manufacturing cabinets, shower stalls, lockers, etc. Solve your fabricating problems by using Sheetlock on all non-metal sheets.

"Fabricating Methods" Booklet—Yours for the Asking!

Join up with Sheetlock and save time and labor

The SHEETLOCK COMPANY
Mfrs. of Self-Fastening Strip
4521 N. CLARK ST. CHICAGO, ILL.

Materials have been released for the manufacture of stokers to be used in factories, apartment and office buildings, hospitals, schools, churches, hotels, etc. Help save fuel and manpower for Uncle Sam.

THE GOVERNMENT ENCOURAGES installations of commercial and industrial stokers. Ask us for details.

GEHL STOKERS

. . . have rust-resisting, all-cast chassis; fuel-saving, Barometric, automatic control of chimney draft, and many other advantages that make sales and satisfied users. Gehl wartime stokers are quality built to uphold the reputation of our 76-year-old company.

When materials are released for domestic stokers, Gehl will have them for you.

WRITE for literature and dealer plan.

GEHL BROS. MFG. CO.
Established 1867 Dept. BC-801 West Bend, Wisconsin

A GEHL WINS FRIENDS WHEREVER IT GOES

ATH-A-NOR
Furnace Repair Parts

The furnace choice of dealers who know performance and saleability has been Ath-A-Nor for more than 50 years. Quality, economy and efficiency have always distinguished the Ath-A-Nor line. Replace with Ath-A-Nor to insure maximum performance and fuel economy! And continue to pile up scrap for munitions and see that it reaches government agencies speedily!

MAY-FIEBEGER COMPANY

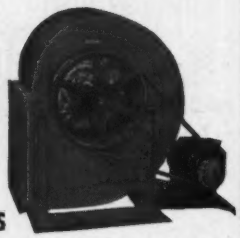
MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

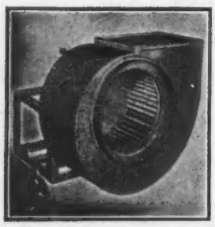
NEWARK, OHIO

YOUR BLOWER Requirements

AVAILABLE AT

Schwitzer-Cummins Company



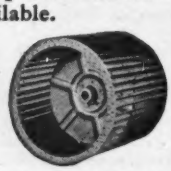


★ **BLOWERS FOR EVERY PURPOSE**

Double Inlet and Single Inlet

HY-DUTY Blowers, 9¾″ to 25″ • Top and Bottom Horizontal, and Top and Bottom Vertical Discharge • Top and Bottom Motor Mounting • Dual Units also available.

★ **CENTER DISC WHEEL**—Double Inlet, Double Width • Reinforced Center Disc • Designed for Modern Air Conditioning and Heating Applications • Sizes, 4½″ to 50″.



★ **ENGINEERING DATA**—Write for Catalogues showing complete Performance Data • Experienced Engineering Department available to help solve your Air Handling Problems.

BLOWER DIVISION

SCHWITZER-CUMMINS COMPANY

1145 EAST 22ND STREET INDIANAPOLIS, U. S. A.

Copper Tubing—CMP Regulation 9A

A METHOD has been established by which copper tubing may be made available for use of repairmen in repairing refrigeration, gas and oil burner, and automotive equipment, through normal distribution channels.

The procedure which is spelled out in Direction No. 1 to CMP Regulation No. 9A, makes copper tubing available to established distributors for sale to persons engaged in the business of repairing refrigeration, oil and gas burner, and automotive equipment.

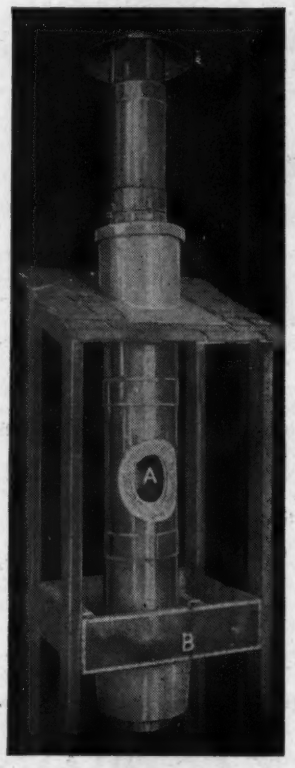
Distributors who were in business on August 1, 1943, and who in 1941 sold copper tubing to repairmen for repairing such equipment are eligible to obtain up to 6,000 pounds of copper tubing each calendar quarter by placing on their purchase orders for it (1) the CMP allotment number "V-3" and (2) the certification contained in CMP Regulation No. 7, as follows:

> The undersigned purchaser certifies, subject to the penalties of section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders to place this delivery order, to receive the item(s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

Such an order is an authorized controlled material order and may be filled by producers of controlled materials.

Distributors may sell copper tubing to refrigeration,

VITROLINER FLUES for Post War HOMES



Will be one of the most important and radical changes in home construction. The Vitroliner Type "E" Flue is suspended from the ceiling and REQUIRES NO FOUNDATION OF ANY KIND. Vitroliner can also be built into partition walls if desired.

New heat saving features will be incorporated in the post war Vitroliner flue which will be much lower priced than the masonry chimney it replaces. Draft will be double that of the masonry chimney of the same height and cross section area.

Type "E" Vitroliner extends from the ceiling "B" thru attic space and roof as illustrated in display model. "A" break-away section shows inner vitreous enameled steel construction and pre-formed Fyrex asbestos insulation. The outer casing sections form a continuous wall of vitreous enameled steel.

Write for details and Folder

Condensation Engineering Corporation

122 SO. MICHIGAN AVE., PEOPLES GAS BUILDING, CHICAGO, ILL.

oil and gas burner, and automotive equipment repairmen who place on their orders the following simple certification:

CMP Allotment Symbol V-3; Preference Rating AA-3

The undersigned purchaser certifies, subject to the penalties of section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board Regulations or orders to place this delivery order, to receive the items ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

Such an order is an authorized controlled material order and may be filled by the warehouse upon whom it is served.

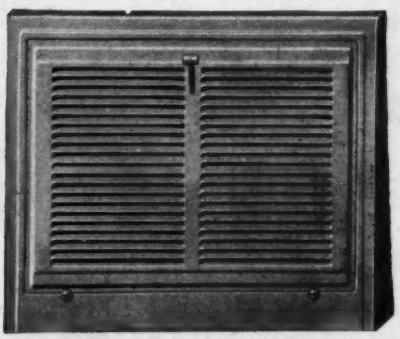
Any distributor who needs more copper tubing than he is eligible to obtain under the Direction or who is not eligible to buy copper tubing under its terms for sale for repair purposes may apply by letter to the nearest WPB field office for authorization to buy the tubing he needs, stating (1) how much copper tubing he needs for resale, and (2) why he needs that amount. If he needs more than a total of 12,000 pounds, he should apply to the Copper Division, War Production Board, Washington 25, D. C., giving the same information.

◆

CMP Regulation 4

RULES governing sales of copper, steel, and aluminum in controlled materials forms and shapes by warehouses and distributors have been modified to ease applicable restrictions on such transactions.

Restrictions on deliveries of steel by warehouses in-



Auer Heat-Rite Baseboard Register

AUER is now engaged principally on vital aircraft parts and other war-time products. We are still able to furnish most styles of registers from inventory stocks, for all purposes permitted by Federal regulations.

AUER REGISTER BOOK Auer SENT ON REQUEST

THE AUER REGISTER COMPANY, Cleveland, O.

AUER REGISTERS & GRILLES - For Air Conditioning and Gravity

BOOST PRODUCTION SCHEDULES WITH

MARSHALLTOWN THROATLESS SHEARS

★

CUT ANY SHAPE

★

CUT ANY SIZE SHEET

★

No. 18 HAND POWER

Here's just the Shear that offers every feature you want. It does hundreds of odd shearing jobs better and faster—yet is an inexpensive hand operated tool. No matter what type of cutting—either irregular shapes or straight splitting—from ANY size sheet, you'll quickly find that the Marshalltown Throatless Shear is the most profitable tool in the shop.

Get Special Shear Bulletin today. Gives details of sizes from 18 gauge to one-half inch capacity.

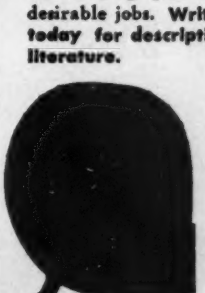
MARSHALLTOWN MFG. COMPANY

920 E. Nevada St., Marshalltown, Iowa

"We Do a Nice Volume Now—Thanks to CLARAGE EQUIPMENT"

War plants, army barracks and other vital war-time buildings need heating and ventilating, or exhaust and blow pipe installations. This high priority business can be your salvation. Specify Clarage Fans, Blowers, Unit Heaters! Nationally known and Nationally accepted, these highest quality air-handling products help you land the desirable jobs. Write today for descriptive literature.

UNIT HEATERS



EXHAUST FANS

VENTILATING FANS

COMPLETE AIR CONDITIONING • COOLING • VENTILATION • FACTORY HEATING • MECHANICAL DRAFT • FANS and BLOWERS for INDUSTRIAL NEEDS

Clarage Fan Company Kalamazoo, Mich.

SALES & ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

PENN-AIRE FURNACES

GRAVITY, CAST IRON

Popular Price
Practical Design
Economical Operation

UNION MANUFACTURING CO., INC.
BOYERTOWN, PA.

Turns Up Flanges In One Operation

EASY EDGER—speedy, simple, accurate. Thousands in use throughout the country.

Turns up right angle, uniform edge on any radius of over 3", and on any curve and irregular shape, in a single operation.

The most useful hand-operated tool especially designed for the sheet metal, air conditioning and ventilating shop.

Write for literature showing the complete Lockformer line.

●

The LOCKFORMER Co.
4617 ARTHINGTON STREET, CHICAGO, ILLINOIS

volving deliveries of 40,000 pounds or more to any one customer at any one time at any one destination have been eliminated from CMP Regulation No. 4, which governs warehouse sales of controlled materials. This action has been taken because the warehouse steel supply situation has improved greatly during recent months.

Steel distributors, however, are still permitted to withhold deliveries of any order which would deplete their stocks and refer the order to WPB for a decision as to whether it must be filled.

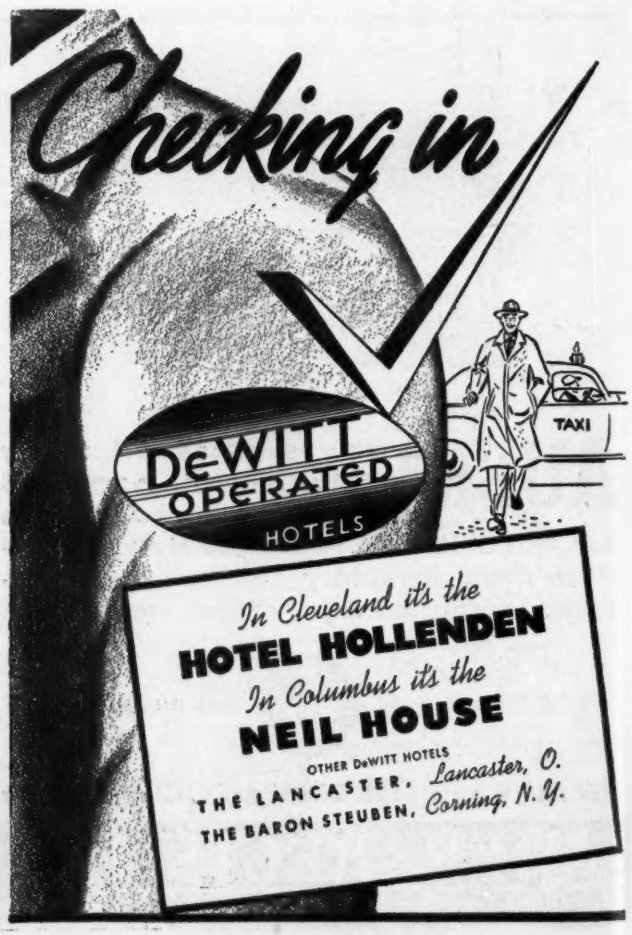
The provision of the regulation permitted distributors to fill orders in amounts of $10 or less, without endorsement, has been modified to permit them to fill orders in amounts of $25 or less without endorsement.

◆

WPB announced Feb. 2 that when two or more preference ratings (split ratings) are assigned to the same production schedule, they must be split proportionately in applying them to each class of production material required.

To illustrate the above rule, if it is decided that $100,000 worth of nuts and bolts and $50,000 worth of wiring devices are to be put into production during a quarter, and the preference ratings assigned to the schedule are 60 per cent AA-2 and 40 per cent AA-3, the AA-2 rating may be used to buy $60,000 worth of nuts and bolts and $30,000 worth of wiring devices and the AA-3 rating may be used to buy $40,000 worth of nuts and bolts and $20,000 worth of wiring devices.

Direction No. 6 to CMP Regulation No. 3, issued at the same time, is identical.



Refrigerant Cooled Spot Welding

(*Continued from page* 71)

were generally about 15 to 25° C. higher than in the refrigerant-cooled electrodes at any particular point in the electrode.

The general contour of the gradient envelope of the maximum and minimum temperatures in both cases seemed similar.

[To be continued]

◆

1944 Private Construction

(*Continued from page* 49)

uary 1 into U. S. Census Bureau regions, 35,000 dwelling units remained to be started in Pacific Coast States, 26,000 in East North Central, 17,000 in West South Central, 14,000 in South Atlantic, and 8,000 in Middle Atlantic. This leaves a total of 15,000 units for the combined New England, East South Central, West North Central, and Mountain regions. Within these regions, private war housing construction during 1944 will be concentrated in localities having a critical shortage of war housing.

CIRCLE CUTTING ATTACHMENT
Included as Standard Equipment
With This Machine

CUTS
...inside or outside
...straight or curved...
flat sheets or formed work

Even an unskilled operator can follow a scribed line, easily and rapidly. Shears flat or formed sheet metal, internal or external, plain or irregular shapes. Vision is unobstructed; both hands are free to guide work at all times. No resistance to feeding or turning. Action of cutters does not "feed" material. *Write for Bulletin.*

Made in sizes up to 60-in. throat, 10-gauge capacity

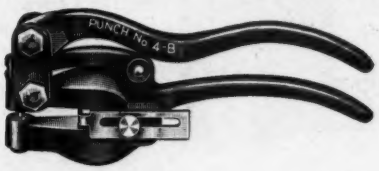
Libert Hi-Speed SHEAR

cleaner, smoother edges... need no finishing

LIBERT MACHINE COMPANY
GREEN BAY, WISCONSIN

3-Q-43

A REAL *Time Saver*



The No. 4B PUNCH by *Whitney*

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of ¼" through 16 ga., weight 3 pounds, 8½" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

ON YOUR MARK!

Get set for "V" Day . . . the day when the bars drop on production restrictions and live dealers profit by a running start on stoker sales opportunities.

C M W

Get on our mailing list for "Advance Tip" bulletins. Send us your name and address NOW.

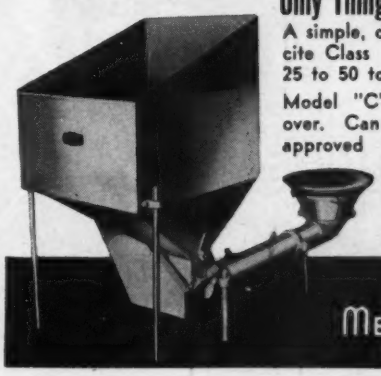
CATSKILL STOKER

Only Thing Available Now!

A simple, dependable, Anthracite Class "A" Stoker for the 25 to 50 ton job.

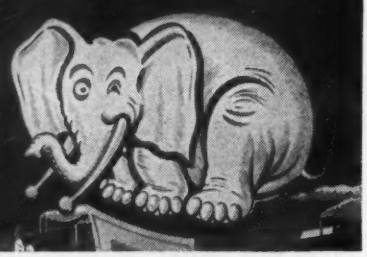
Model "C"-65 Hopper Spillover. Can ship at once on approved P.D.668 or 1612 Certificates.

Made by one of the largest producers of Anthracite Stokers



CATSKILL METAL WORKS, INC.
CATSKILL, NEW YORK

HOW TO KEEP WHITE ELEPHANTS OFF THE ROOF WHEN SEEKING HIGH TEMPERATURE RELIEF



The Allen Laminar-Flow Ventilating Roof Valve can open up 91.5% of a roof for ventilation purposes. No other unit can match this performance. Competitive figures on a recent job showed that Allen was able to provide huge quantities of gravity ventilation with only 114 tons of steel. Standard designs using a bifurcated air stream approximated 260 tons or 128% more steel to do the same job. Excess cost of the steel alone would be approximately $11,000. *Allen is the only manufacturer in the United States that can offer you a large area gravity type ventilating roof valve that has better than 80% free area within the limits of its case.*

If you have a high-temperature relief problem, tell us how many BTU you put in the building and what final temperatures you can permit under the roof and we will give you a calculation based on modern psychrometric practice that will be an intelligent estimate of what you can expect in your plant. *The Allen Corporation, 9751 Erwin Avenue, Detroit 13, Michigan.*

THE Allen CORPORATION

ENGINEERED VENTILATION FOR INDUSTRY

Kruckman — Why You Don't Get Materials

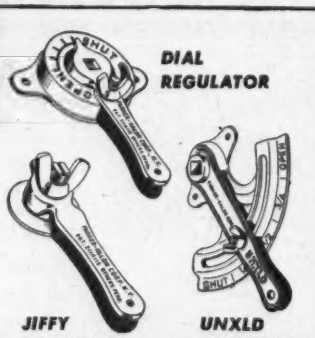
(*Continued from page* 47)

increasingly successful. Here is a small thing, but it is a good illustration; the people who make lipsticks have been able to formulate appeals that have given them metal to make 7,000,000.

It will be sound sense to study the orders that apply to your industry to find out how to use the appeal privileges. Appeals as well as other proceedings are daily becoming more simple. But always remember these privileges apply only to those things which are in the list of permitted products. Don't kid yourself into the vain hope that other civilian end-use products will be permitted. WPB is consistently and faithfully striving to force less production of things that absorb manpower, facilities, and materials the armed services may need. Relaxation may permit the use of more metals, but the metals will be permitted chiefly as substitutes for the materials that have grown scarce. Each day amendments are issued which virtually eliminate the use of plastics, paper, lumber, and similar materials, and permit the use of metals instead.

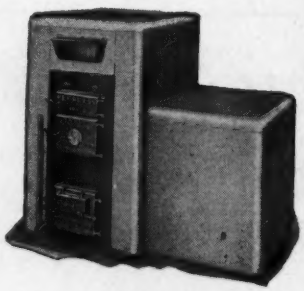
For instance, there is the often quoted example of baby carriages. When metals became scarce it was permitted to make a certain limited quantity of baby carriages with wood. Now they may be made of steel. But be sure to note that even with the abundance of metal it is not permitted to make more baby carriages than the quota fixed under war conditions. You will be permitted to make furnaces and controls and grills and other supplies, but you will not be permitted to

A Type And Size For Every Need



For efficiently controlling light and medium dampers in heating, ventilating and air conditioning systems, specify Parker-Kalon Damper Controls. The line includes all types and sizes, at a range of prices to fit the needs of any job. Parker-Kalon Corp., 190-192 Varick Street, New York.

PARKER-KALON damper controls



PEERLESS
WARM AIR FURNACES

Peerless Furnaces, including the Commander Heavy Duty Model for extra large buildings, are available under W. P. B. regulations. Fittings and registers are also available.

Repair Parts for All Makes of Warm Air Furnaces.

PEERLESS FOUNDRY CO., INDIANAPOLIS, IND.

Pioneers in Warm Air Heating for Over a Third of a Century

Majestic FURNACES For Better Heating!

Handled Exclusively Through Established Dealers

Seasoned With 40 Years Experience

. . . In New Developments For The Future

The Majestic Co., 912 Erie St., Huntington, Ind.

make more than the quantity already fixed. There will be no relaxation of existing limitations. Even the plan to allow small businesses in noncritical labor areas to have unlimited use of abundant materials will probably be abandoned. There may be enough labor in the area, but there is every likelihood that the surplus labor will be asked to shift to critical areas. And there may be enough copper strip, but there is not enough aluminum strip and not enough tubing. It is obvious it would be pointless to permit production of things that cannot be finished.

Reconversion—Who and How

You have heard much about reconversion. Donald Nelson has made clear, however, that the entire program of reconversion will be kept on ice until the invasion program has unfolded its course more clearly. The current talk will center more on *how* and on *who* will do it than on actual specific plans in time and space. We do not even know at this time whether or not the Surplus War Property Administrator, William L. Clayton, former assistant Secretary of Commerce, will be accepted by the Congress. It was the former head of the OCR, Arthur D. Whiteside, who urged that a triumvirate from WPB be placed in charge. He suggested Donald Nelson, Charles E. Wilson, and J. A. Krug. Under the Baruch Plan, WPB will be required to prepare a list of civilian items to be produced first. Apparently WPB will recommend railroad equipment, truck parts, refrigeration equipment, and numerous smaller civilian items. The Baruch plan also recommends WPB priority controls, allocation controls, OPA price controls, and Presidential requisititionng powers, to be continued after

Elgo Ventilating Specialties

The Favorite Automatic Shutter

The Elgo Automatic Shutter is the favorite of many large users because of its outstanding features. Adjustable for different air velocities. Easier opening and tighter closing. Weatherstripped on all sides. No flapping or fluttering. Sizes 10" to 60" square—also rectangular.

Write for circular and prices!

"ELGO" TYPE AUTOMATIC SHUTTER Rear View (Closed)

Free Catalog

ELGO SHUTTER & MANUFACTURING CO.
6966 W. Jefferson Detroit 17, Mich.

• BARBER
Gas Pressure REGULATORS
for Reliability!

Certified by A. G. A. Testing Laboratory. Write for Catalog and prices on Barber Conversion Burners, Appliance Burners, and Regulators.

THE BARBER GAS BURNER CO.
3702-4 Superior Avenue
CLEVELAND OHIO
Sizes 1/4" up

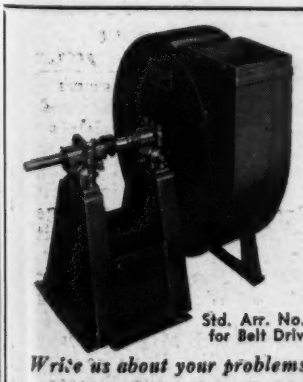
Vernois

Wise dealers choose genuine Vernois Furnace parts for repair work. They save time and labor—they're built to do the job *right!* Order Vernois parts direct and be sure you get the genuine.

MT. VERNON FURNACE & MFG. CO.
• • • MT. VERNON, ILLINOIS

For Balanced Atmosphere
THERMO-DRIP HEAT-CONTROLLED HUMIDIFIERS

AUTOMATIC HUMIDIFIER CO. Cedar Falls, Iowa



Std. Arr. No. 1 for Belt Drive

New and improved "EX" Fans are now available in standard sizes from No. 15 to No. 80 and from 200 to 30,000 CFM Capacity with pressures up to 15" W.G. These fans are commonly used for exhaust problems to handle dust, fumes, shavings, etc., but can be adapted for forced draft service.

"EX" Fans are furnished in all standard arrangements of the N.A.F.M. The design is such that it can be easily modified to suit special assemblies, thus "EX" Fans are ideal for resale purposes, as part of factory assembled units.

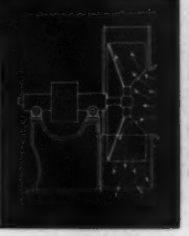
Write us about your problems. Send for Bulletin No. EX-41

BAYLEY BLOWER COMPANY
1817 South 66th Street Milwaukee, Wis.

PLANING MILL EXHAUSTERS

DIAGRAM shows how special streamlined inlet deflects airstream soas to reduce turbulence and back plate erosion. Result: higher over-all efficiency, lower maintenance cost, less time out for service and repairs.

SEND FOR DETAILS *including performance and dimensions in Catalog 410.*



B. F. STURTEVANT COMPANY
HYDE PARK BOSTON 36, MASS.

REPAIRS FOR ANY FURNACE BOILER OR STOVE

REPAIR PARTS FOR ANY FURNACES-BOILERS OR STOVES

Complete Line of Sundries and Supplies

FOR QUICK SHIPMENT

OMAHA STOVE REPAIR WORKS

1206-8 DOUGLAS ST., OMAHA 2, NEB.

SINCE 1882

ALLEN

...Has The RIGHT

SODERING FLUX

For Every Sheet-Metal Job!

Let Us Help You With Your Problems

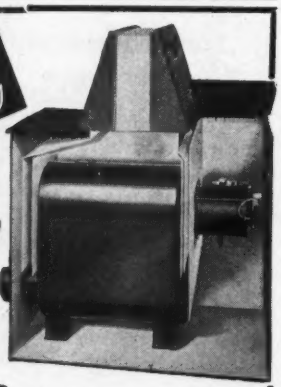
L. B. ALLEN CO., Inc.

6702 Bryn Mawr Ave., Chicago, 31, Ill.

Remember COLE HOT BLAST

LINE OF OIL & GAS-FIRED FLOOR FURNACES

Will again be on the market as soon as its over—meanwhile we're in war work.



Our popular oil-fired Floor Furnace

COLE HOT BLAST MFG. CO.

3108 W. 51st St. Chicago, Ill.

Sand-Grind-Brush

with Black & Decker Electric Sanders

7" Special **$53**

These husky tools drive abrasive discs, wire brushes, grinding wheels and other attachments . . . make quick work of removing paint and rust, smoothing welds and casting ridges, and many other metalworking jobs. Powerful Universal motors. See your Black & Decker Distributor, or write to: The Black & Decker Mfg. Co., 782 Pennsylvania Ave., Towson-4, Maryland.

Black & Decker

Portable Electric **TOOLS**

DRILLS, HOLE SAWS, DRILL STANDS, LECTRO-SHEARS, BENCH GRINDERS, SANDERS, PORTABLE GRINDERS

the war. The steel division has 600 items it will suggest for prompt peace production.

Government people feel that each industry should be restored to the competitive place it occupied in 1941, and that newcomers should be shut out. The program is to keep the plants on the West Coast at the war work they are now doing for the duration. Consequently, some West Coast plants are buying Eastern plants in order to be ready to share in the reconversion prosperity at its earliest. The Baruch Plan would frown on Government competition with private business, and it would not countenance Government subsidies for new ventures which would cause trouble for existing businesses. Traditional American business methods are to be preserved. The Baruch Plan and the George Plan—from Congress—are parallel in major essentials. Small firms would get the initial breaks. There would be no boondoggling. Baruch suggests prices should be raised if necessary to encourage civilian production. He thinks this is the time to hunt for machine tools. Materials, when allocated, should be held until the invasion trend is clear.

When the disposal of plants begins, the idea is to defer to the need of an industry as a whole, and to plan sales with collective industry problems in mind. Procurement Division of the Treasury is to sell consumer goods other than food; RFC is to sell capital and producer goods; Maritime Commission would sell ships and maritime property; and WFA, through its new Food Price Division, would sell food. Property would be leased and traded if it is sound business. Very small lot sales are to be particularly encouraged. Spot sales will be promoted. Baruch would organize disposal during the war, if possible, to take advantage of prices and demand. Over $200,000,000 worth of sur-

REMEMBER — TO BUY GENUINE REPAIR PARTS for ROUND OAK — Furnaces Stoves and Ranges

ROUND OAK COMPANY

Dowagiac Michigan

FEW AS GOOD — NONE BETTER

Stokers, Handy Fittings, Repairs — **GILTEDGE** FURNACES — Blowers, Rock Island, Registers, Humidifiers

All genuine Gilt Edge repairs carry a label saying "Genuine Gilt Edge Part." We have genuine Gilt Edge repairs for Gilt Edge Hummer, Gilt Edge Crescent, Gilt Edge Radium, Gilt Edge Badger, Gilt Edge Liberty, Gilt Edge Solar, Gilt Edge Fireside, 500, 600, 700, 800 and 900 Series Furnaces and Gilt Edge Round and Square Boilers. We are successors to the Schwab & Sercomb Co., R. J. Schwab & Sons Co., and the Schwab Furnace & Mfg Co. Buy from jobbers who carry genuine Gilt Edge repairs or write us. We can furnish a Gilt Edge Furnace on the proper priority.

SCHWAB FURNACE CO. 193 SO. SECOND STREET MILWAUKEE 4, WIS.

plus property is now ready for disposal. Used Army trucks, raw wool, and various equipment made by plants already closed, are ready for disposal. It is estimated $50,000,000,000 worth of property will be sold before the last item is merchandised by the Government.

They say Whiteside was given the privilege of nominating his own successor. At this writing he has not done so. OCR is still without a head. The grapevine says the Administration seeks a big name. Gossip has suggested that J. A. Krug may absorb OCR. Krug is the bulky young man from Tennessee, who was a star student and a star footballer at the Univerisity of Wisconsin. He came into this Government by the way of TVA. He is a friend of David Lilienthal. He is under 35, and weighs abundantly over 200 pounds. His power in WPB equals that of Charles E. Wilson, and he is regarded as one of the great forces in the war government. At this time he is Vice Chairman of two or three major parts of WPB, and has surrounded himself with an extraordinary group of coming young men. If he takes over OCR, it will come under a liberal influence. There is no doubt he would streamline it.

Gossip also has intimated that Krug might turn OCR over to his friend from Memphis, Max Jarman, head of the International Shoe Company. Jarman has acted as advisor and consultant in OCR for several months. They also mention Henry A. Dinegar, Director, Consumers Durable Goods Branch of OCR. Dinegar has a fine professional background, is a businessman, has an exceedingly pleasant personality, and is well qualified as the champion of the civilian producer

(*Continued on page* 122)

SALES EXECUTIVE WANTED

An old established manufacturer wants a *very good man* to direct the sales and merchandising activities of its heating and air conditioning department.

The man to fill the position should

(1) Possess considerable native ability.
(2) Have a pleasing personality and be able to get along with new people.
(3) Be willing to work long and hard as the exigencies of the situation require.
(4) Should be able to analyze sales territories, markets, trends, etc.
(5) Have the ability to direct people and create esprit de corps within an organization.

He should possess those attributes necessary to profitably manage selling and merchandising activities involving a sales volume in excess of $10,000,000.

To such a man, substantial remuneration is available with profit participation depending upon the responsibilities he is able to discharge.

All information will be kept strictly confidential.

Furnish complete details in writing direct to:

THE JOHN PRICE JONES CORPORATION
150 Nassau Street (Dept. E) New York, N. Y.

GILCO
Automatic
FURNACES and WATER HEATERS
GILCO
J. L. GILLEN CO.
DOWAGIAC • • MICH.

Leader
KOOLSTACK FURNACES
FOR STOKERS
OIL or HANDFIRED
50,000 to 200,000 BTU's
Patented Damper Uses All the Heat in the Added Heating Surface
THAT IS SOMETHING TO SELL
LEADER IRON WORKS, Inc.
Decatur Illinois

KEEP A FULL FORCE WORKING!

Keep all your men on full time working schedules by having them install Streekno in all your warm air heating jobs. Streekno saves hundreds of dollars in decorating, eliminates dirt streaks above and around registers.

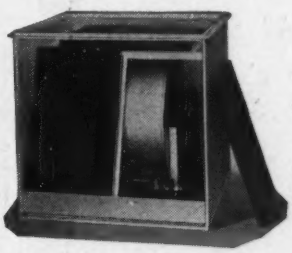
Millions of home owners want it. It sells for only $2.00 and you make a big profit. Don't lose men in the slack season.

Write today for complete details about merchandising help and a STREEKNOTIZING campaign of your own.

EXCEL HEATING & AIR CONDITIONING CO.
3715-19 Belmont Ave., Chicago 18, Ill.

Repair Parts
FOR ALL HEATING UNITS
BRAUER REPAIR PARTS
STOVE FURNACE BOILER OIL STOVE RANGE
A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment
2100 Washington Ave. St. Louis, Mo.

You can Profit with this



Properaire
DEALERSHIP

● With the Properaire dealership you have a line of all purpose multiblade blowers, ranging from 8" to 16" wheel sizes, with single or double inlets, direct or belt driven units . . . Package units with or without insulation.

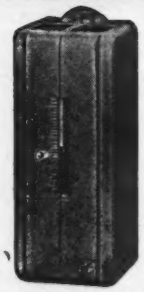
● While our present production conforms to the conservation program of the government, our dealership plans are now being set up for the post-war period. Send for literature.

GRAND RAPIDS DIE & TOOL CO.
1200 Godfrey Ave., S.W., Grand Rapids, 2, Michigan

RUGGED CONSTRUCTION
SIMPLE OPERATION

MASTER
HEAT REGULATOR

TYPE A-23 Positive snap action—operates quietly, surely and safely.



WHITE MFG. CO.
2368 University Ave., St. Paul, Minn.

MERCOID
VISAFLAME
(LIGHT ACTUATED) CONTROL SYSTEM
FOR DOMESTIC AND INDUSTRIAL OIL BURNERS

RECOMMENDED FOR YOUR POSTWAR PLANS

For domestic oil burners write for Bulletin V-6
For industrial oil burners write for Bulletin V-4

THE MERCOID CORPORATION, 4201 Belmont Avenue, Chicago, Illinois

WISS "METAL MASTER"

Compound Action
AVIATION
SNIPS

Used extensively by leading aviation and metal working industries and in U. S. Government Plants throughout the country.

- Cuts circles, squares and irregular patterns on Stainless, Dural, and Monel Metals with ease.
- All Parts interchangeable.
- M1 for cutting left—M2 for cutting right.

WISS BULLDOG AND STANDARD PATTERN SNIPS are used in Shipyards, on Government construction projects, and on maintenance work wherever sheet metal is required.

Send for literature of complete line

J. WISS & SONS CO.

ESTABLISHED 1848 NEWARK, N. J.

NiAGARA
GRAVITY AND FORCED AIR
FURNACES

DURABLE • EFFICIENT • DEPENDABLE • ATTRACTIVE

THE FOREST CITY FOUNDRIES CO.

2500 WEST 27TH ST. • CLEVELAND 13, OHIO

☆ WAR TIME

The Farquhar Furnace Co., Wilmington, Ohio, is manufacturing sheet metal gear guards and steel sub-assemblies for equipment for Army and Navy. About one-third of their business consists of war orders.—**F. H. Farquhar, Secretary.**

Thatcher Furnace Company, Garwood, N. J., has a total of 45 men in service from plant and office; including **William White**, a former salesman, and **Russel Cook**, divisional sales manager.

A large majority of employees have subscribed for war bonds.

Fifty employees have seen action in the services and two men have been lost—**William Bainbridge** of Hillside, N. J., and **Arthur Wells** of Westfield, N. J.—Carl Sahler, Sales Manager.

Spencer Heater Division, The Aviation Corporation, Williamsport, Pa., reports that better than 80 per cent of their total is war production, covering materials for both the Army and Navy. The following are in service:

M. D. Vicchiarelli—Service Engineer—Army—Lieutenant
J. R. Reeder—Accountant Clerk—Army—Lieutenant
G. T. Peifer—Buffalo Sales Representative—Army—Captain
W. I. Higgins—South Jersey Representative—Navy—Mediterranean Area
Leonard A. Howley—Scranton Sales Representative—War Production Board, Washington.

The company has kept up a steady drive for 100 per cent war bond purchases by employees.

1st Lt. J. R. Reeder is now in foreign service, and W. I. Higgins is in the Mediterranean area.

The Army-Navy "E" for outstanding achievement in the production of air conditioning and refigeration for war has been awarded to the **York Corporation** of York, Pa., at special ceremonies attended by more than 5,000 war workers and their families.

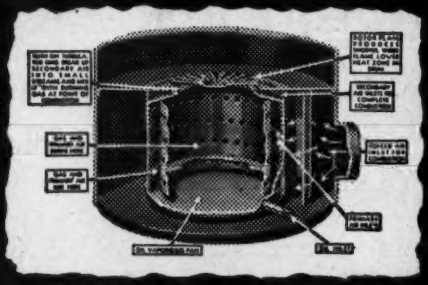
In presenting the award, Brigadier General H. F. Safford, Chief of the Production Service Branch of the Army Ordnance Department, warned Americans they are making a tragic error if they count on the sudden collapse of their powerful German and Japanese enemies. He declared that instilling over-optimism to cause a slackening in our production efforts is part of a cunning propaganda campaign being waged by the Axis.

W. S. Shipley, Chairman of the Board of York acted as chairman of ceremonies and S. E. Lauer, President, formally accepted the "E" pennant.

In addition to its regular production of refrigeration and air conditioning for military and industrial applications, York is also devoting 25 per cent of its manufacturing facilities to direct ordnance.

Famous Patented *Monogram* Vaporizing Burn
Provides Highest Known Operating Efficiency with Oi

Full Forced Winter Air Conditioners
•
Booster Gravity Units



Utility Room Units
•
Automat Water Heater

The QUINCY STOVE MFG. COMPANY, Quincy, Illinoi

TRADE NEWS ☆

J. V. Patten Company, Sycamore, Illinois, reports the following in Government service:

C. Arlie Pearce, formerly commercial artist and superintendent of the Metal Sign and Emblem Department, is now with the U. S. Army Air Force, stationed at Chanute Field, Rantoul, Illinois, doing photographic art work in the visual education branch of the AAF. He recently had charge of the interior decoration of the two large theatres at Chanute Field.

Irene C. Lally, formerly secretary to J. V. Patten, is now with the Waves, stationed at New York City and doing secretarial work for various naval officers.

The company received the Army-Ordnance Banner for Meritorious Production on December 10th—the only award the army makes to any sub-contractor. A large contract for aircraft parts by Interstate Aircraft & Engineering Corporation of DeKalb has just been awarded the Patten Company, in addition to production of bullet cores and Aircraft Engine Lock Nuts. Eighty-five to ninety per cent of present business consists of war orders.

Forty-two per cent of the number of people employed in the Patten plant at the start of the war are now in the armed services. Many have seen action in both the European and South Pacific theatres.—**Don C. Patten.**

Kehm Corporation, 135 S. LaSalle St., Chicago, reports the following in service:

E. F. Ford, Asst. Sales Mgr.....Ensign, Navy Air Corps
Robert Harrop, Sales Engineer.....Lt. Army Air Corps
Bill Keil, Engineer.....Sergeant Tank Corps

The company has a substantial contract with FPHA for Free-Aire coal heaters for use on temporary defense housing; supplying heaters for FHA privately financed war housing to contractors; contracts with manufacturers of shower stalls for concrete bases; also contracts with Navy for concrete products of various types. About 95 per cent of present business consists of war orders.

The company has new plants at

Miami, Florida—Concrete Products (Kemetex) for Navy;

Lowell, Illinois—Shower Receptors for shower stall manufacturers;

North Chicago, Illinois—Free-Aire coal heaters.

The Kehm Corporation has developed a new concrete product—Kemetex—of light weight and high tensile strength for use in plumbing fixtures and as substitute material on certain war products formerly requiring steel. War also required the development of the Kehm Free-Aire fan-operated coal heater as substitute for former gas-heater line. This heater is applied with little or no use of duct work in the Free-Aire type system—a before-the-war development for no-basement low-cost houses—which has fitted into the present war housing need to conserve metals.—**H. R. Coleman, Sales Manager.**

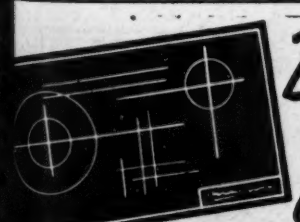
ECON-O-COL
the "Stronghearted"
STOKER
ECON-O-COL Automatic COAL BURNER
ECON-O-COL STOKER DIVISION
COTTA TRANSMISSION CORP.
ROCKFORD ILLINOIS
THE SHIELD OF QUALITY

CHENEY METAL
The Modern SHEET METAL
- SUPERIOR TO GALVANIZED IRON
- WEATHER PROOF
- FIRE RETARDANT
- MOISTURE PROOF
- FORMS EASILY WITH REGULAR SHOP TOOLS

CHENEY METAL PRODUCTS CO. TRENTON, N.J.
WRITE FOR DESCRIPTIVE FOLDER AND THE NAME OF YOUR NEAREST DISTRIBUTOR

Bremil

Two Sizes
PORTABLE SHEARS
Your work will proceed faster and neater when you use Bremil Portable Shears on the job or in the shop. Write today for literature showing complete line.
ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be obtained for shearing stainless steel
BREMIL MFG. CO., ERIE, PA.


Blueprint for Peace
While our machinery spins to turn out the goods of war, our drafting rooms and experimental laboratories hum with activity on post-war heating and air-conditioning products. We'll be ready for the post-war period; you can depend on this.
CONCO CORPORATION
Division of H. D. Conkey & Co., Mendota, Ill.

Write for Catalog and Prices

SPEED UP ORDERS with a
BEVERLY SHEAR
Throatless shears that cut any shape . . . straight, circular or irregular. FASTER — Precision — accuracy! Order No. 1 for 14 gauge. No. 2 for 10 gauge. No. 3 for 3/16 inch mild steel and 10 gauge stainless.
BEVERLY SHEARS CO.
3808 W. 119th Pl., Dept. 1
CHICAGO, ILL.

CHICAGO STEEL BRAKE

BEST BY FORTY-TWO YEARS TEST

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO 36

REPAIR PARTS
for any and all makes of
STOVES—FURNACES—BOILERS
Also MODERNAIRE FURNACES
Fittings, Registers, Supplies

DES MOINES STOVE REPAIR CO.
Sam C. Green
Fred R. Green
DES MOINES, IOWA
Since 1869

Effective
Ridge
Ventilating

Airidge Ventilation
All materials and sizes. Shipped in 10-ft. lengths. Dampers optional.

ÆOLUS DICKINSON
33RD STREET AND S. ARTESIAN AVENUE.
CHICAGO 8, ILLINOIS

SPOT WELD
WITH AN
ACME "Hot Spot" WELDER
Proven utility for over 26 years in thousands of sheet metal fabricating plants.
Write for Literature and Prices.
Complete Range of Sizes
Lifetime Guarantee!

ACME ELECTRIC WELDER CO.
2618B Fruitland Road Los Angeles, Calif.

and consumer. The chief trouble with Denegar is the absence of a conspicuous public background.

It may be useful to close this appraisal of the situation in Washington as it affects your industry by referring to one aspect that you hear mentioned occasionally among the upper layer of officials. They speculate upon the growing unemployment. They seem to doubt that the system of shifts planned by WMC is an adequate antidote. They feel we are confronted with a cosmic race—a race between Invasion and Unemployment.

◆

Condensation Engineering Company has taken downtown quarters in the Peoples Gas Building, Chicago, due to increased activities in the new Vitroliner flue and also in anticipation of postwar developments.

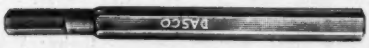
E. O. Howle, President of Condensation Engineering, considers it more or less necessary to have this downtown office in order to co-operate better with the Peoples Gas Light & Coke Company and other public utilities.

◆

Death of Charles C. Fuller

Charles C. Fuller, who had been connected with the retail furnace department of Phillips-Buttorff Manufacturing Co., Nashville, Tennessee, for several years and more recently president of Fuller-Cunningham Company, a Nashville roofing and tile firm, died February 24. He was past president of the Nashville Civitan Club and for 23 years was treasurer of the Woodland Street Presbyterian Church. He was a member of Belle Meade Country Club, Richland Golf Club and Elks.

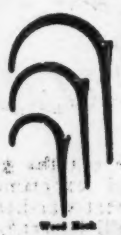
DASCO
Forged
HAND TOOLS



Chisels, punches, drills, nippers and numerous other hand tools . . . quality built for long service. Sold by leading jobbers.

DAMASCUS STEEL PRODUCTS CORP., ROCKFORD, ILL.

BB
HOOKS & HANGERS



THRU
LEADING
JOBBERS
EVERYWHERE

BERGER BROTHERS CO.
Main Office & Factory
226-237 Arch St., Philadelphia, Pa.

A Book for YOU — and YOU — and YOU

Engineer — Architect — Contractor — Dealer

A NEW Heating, Ventilating, Air-Conditioning GUIDE

REVISED — 1944 EDITION — IMPROVED

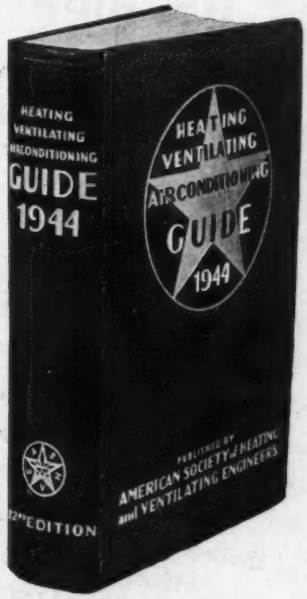
1,184 Pages—49 Chapters—Concise—Compact—Convenient

Fundamentals for the Entire Industry

In Seven Chapters, are fundamental data on Air and Water; Heat Transfer and Heat Transmission with data on Insulation; Air Leakage; Heating and Cooling Loads; Combustion of Fuels and Methods of Estimating Fuel Consumption; Chimney and Draft Calculations; and Automatic Fuel Burning Equipment.

Steam and Hot Water Heating

Seven chapters treating the entire subject: Boilers, Radiators and Convectors; Steam and Hot Water Heating Systems and Piping; data on Pipe, Fittings and Welding; District Heating; a chapter on Radiant Heating; and Water Supply Piping and Water Heating.



Air Heating, Cooling and Conditioning

Fifteen chapters covering the field of Warm Air Heating—gravity type and mechanical furnace systems; Central Systems for Comfort Air Conditioning; Unit Heaters, Ventilators, Humidifiers; Unit Air Conditioners, Air Coolers and Attic Fans; data on Cooling, Spray Equipment, Dehumidification, Dehydration; Refrigeration; Heat Transfer Surfaces; Air Pollution and Air Cleaning; Fans, Air Distribution, Air Duct Design, and Sound Control.

Automatic Controls, Instruments, Motors

Information relating to Automatic Controls for heating, and cooling equipment; Instruments and Test Methods; Motors for use with heating, cooling and ventilating equipment; and Motor Controls.

Many Chapters on Special Applications

Including Air Conditioning in the Treatment of Disease; Natural Ventilation, Industrial Air Conditioning, Exhaust Systems, and Drying Systems; Pipe and Duct Heat Losses with data on Insulation; and a new chapter on Marine Heating and Ventilating.

And for convenience of men in the profession and the industry—especially for men just entering this field—there are chapters on Terminology; recognized Abbreviations, Symbols and Standards; information on State Codes relating to heating, ventilating and air conditioning requirements.

READY IN FEBRUARY

ORDER NOW ➡

Fill in this ORDER FORM
Mail it to the SOCIETY
at 51 Madison Ave.,
New York 10, N. Y.

★

1922 — 1944

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS
51 Madison Avenue, New York 10, N. Y.

Enclosed is $5.00 for standard edition of Heating, Ventilating, Air Conditioning Guide 1944, please send me a copy. It is understood that I may return it within 10 days, if it is not satisfactory, and you will refund my money.

Name .....

Position .....

Firm .....

Address .....

City and State .....

REMITTANCE WITH ORDER ☐ MONEY ORDER ☐ CHECK

A MESSAGE FROM THE TREASURY

TO THE RETAILERS OF AMERICA!

When the Treasury turned to the retailers of America for help in selling "E" Bonds in the 4th War Loan drive, we knew we were calling upon some of the keenest salesmen and best merchandisers this world has ever seen. But we didn't quite realize what a magnificent job these retailers would turn in!

Here are a few of the highlights—a few preliminary figures that tend to give some measure of the tremendous contribution made by retailers to the success of the 4th War Loan drive.

Over 25,000 stores, including the vast majority of the country's largest, reached—or exceeded—their Store Quotas, and are now proudly displaying their official 4th War Loan banners.

And many hundreds of thousands of retail sales persons reached—or exceeded—their individual sales quotas of $200 in "E" Bonds! It was, indeed, this magnificent personal selling job that put this whole retail effort over the top. Every one contributing to this splendid record can take well earned pride in his, or her, individual citation for service.

For the planning and the hours of hard work on the part of every store and every individual in any way contributing to the success of this drive, the Treasury Department now takes this opportunity of expressing its sincerest thanks!

Ted R. Gamble

National Director War Finance Division

This is an official U.S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council

The Treasury Department acknowledges with appreciation the publication of this message by

AMERICAN ARTISAN

Let's ALL Keep Backing the Attack—with WAR BONDS

AMERICAN ARTISAN Service Section

SERVICE SECTION: Rates for display space in the Service Section are $5.00 per inch per insertion. One-inch minimum space accepted.

Classified Section: Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. Cash must acompany order.

Classified

HELP WANTED

EXPERIENCED FURNACE SALESMAN, RETAIL—Large, well-established heating company has opening for several experienced men to work in New York, Brooklyn and Westchester County. Permanent, rapid promotion. At least $40.00 per week guaranteed to start. Railroad fare paid if over 300 miles away if necessary. Write giving us your sales ability, etc. Address Key No. 577, American Artisan, 6 No. Michigan Ave., Chicago 2, Ill.

HEATING ENGINEER WANTED

Creative engineer to assist in design of a line of post-war furnaces for all fuels. Factory not handicapped by tradition or obsolete equipment. Excellent proposition to the right man. Address Morrison Steel Products, Inc., 601 Amherst Street, Buffalo 7, New York.

TINNER WANTED: Good, all around man. Steady work. Good pay. General Sheet Metal Shop. Address Metal Products Co., 501 W. Colorado Ave., Colorado Springs, Colo.

FOR SALE

For Sale—One used Keuffel and Esser anemometer in leather case. Address Key No. 576, American Artisan, 6 No. Michigan Ave., Chicago 2, Ill.

POSITION WANTED

MANAGEMENT EXECUTIVE

Experienced Heating and Air Conditioning industry, all phases business administration, sales engineering, production, advertising and purchasing. Interested in permanent Eastern location; Salary open. Address Key No. 575, American Artisan, 6 No. Michigan Ave., Chicago 2, Ill.

WANTED TO BUY

Wanted to Buy—Small or medium sized steel furnace manufacturing plant, including all patterns, fixtures, machinery, good will, and manufacturing rights. Will lease or purchase real estate. Also interested in purchasing furnace fitting manufacturing plant. Give complete description and price in first letter. Address Key No. 578, American Artisan, 6 No. Michigan Ave., Chicago 2, Ill.

QUICK DELIVERY

BRAKES
POWER: 10'10 ga., 8'14 ga., 6'14 ga.
HAND: CHICAGO STEEL: 10'18, 8'16, 8'18, 6'18, 5'18, 3'16 ga.

FOLDERS
36", 30", 21", 20" PEXTO & NIAGARA.
60" NIAGARA POWER PIPE FOLDER.

MILLS
PLAIN: Nos. 5, 3 and 2 CINCINNATI; No. 2-S & 2-B K&T, Double Overarm; No. 4 LEBLOND; NEWTON KEYWAY MILLER.
VERTICALS: No. 5-B BECKER; Nos. 2&3 BROWN & SHARPE; No. 2½-B K&T.
UNIVERSAL: No. 3. CINCINNATI, M.D.

PUNCHES
HAND: No. 10 EXCELSIOR, 19" throat; No. 56 Niagara, ¼" thru ⅛"; No 40 WHITNEY, 5/18" thru ⅛".
DEEP THROAT: No. 15 TOLEDO; No. 20 EXCELSIOR; No. 135-A NIAGARA.

PRESS BRAKES
Nos. 335, 255 & 254 CHGO. STEEL; 10' POORMAN.

ROLLS
POWER: 12' HILLES JONES, ⅜" cap.
ANGLE: 6x6x¾" WICKES.
LEVELLER: 5' NILES. 7 Rolls, 6¼" dia.

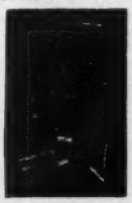
SHEARS
10'3/16" OHL; 10'16 ga. OHL; 10'14 ga. BERTSCH; 10'18 ga. PEXTO.
POWER GAP: 10'3/16" CHICAGO STEEL; 5'16 ga. WAIS & ROOS.
FOOT: 8'20 ga. CHICAGO STEEL.
RING & CIRCLE: No. 510 Niagara, ⅜" Cap.; 10 ga. LENNOX CIRCLE SHEAR.
ROTARY: 14 ga. QUICKWORK & YODER.
QUICKWORK, Shears 5/32"; Flanges ⅛".

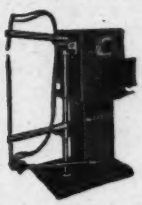
SPOT WELDERS
250 KVA FEDERAL, 50 KVA SWIFT, 20 & 30 KVA GIBB, PRESS TYPE; 20 & 25 KVA THOMPSON; 10 KVA TAYLOR; 10, 13 & 15 KVA AEF. 35 KVA GUN WELDER.

MISCELLANEOUS ITEMS
48" NIAGARA POWER GROOVER; No. 737 PEXTO FOOT NOTCHER.
20 ft. Draw Bench.

SEND FOR COPY OF MARCH "MACHINERY MART"
INTERSTATE MACHINERY CO., INC. YARDS 5800
1433 W. PERSHING RD., CHICAGO 9, ILL.

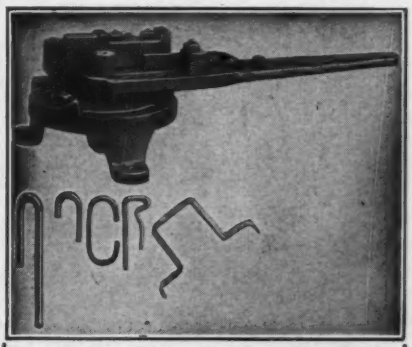
WELDING HEADQUARTERS





Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

EISLER ENGINEERING CO.
CHAS. EISLER
751 S. 13th St. (Near Avon Ave.) Newark, N. J.



THE HINMAN BENDERS
Angle & U, Eye and Pipe
Write for catalog.
manufactured by
L. R. EVANS MACHINE COMPANY
SANDWICH, ILLINOIS

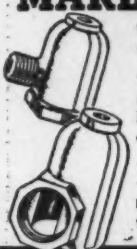
FANS
BLOWERS
EXHAUSTERS
"Lungs for Industry"

REBUILT and GUARANTEED
Prompt Shipments From Large Stocks
All Types—All Makes—All Sizes
And We Really Rebuild 'Em
Why Wait Months for New?

GENERAL BLOWER CO.
Phones: MONroe 0244
403 NORTH PEORIA ST.
CHICAGO 22, ILL.

Better for Every Spraying Purpose

MARLEY SPRAY NOZZLES



"Tops" for Air Washing, Humidifying, Brine Spray Lofts, etc. Marley nozzles lead all in sales and in profits to you.

*Finer, more uniform spray.
*Effective operation at Low Pressures. *No internal parts to clog or wear.

MARLEY CO., INC. Write for Literature Now! Kansas City, Kansas

GRAND RAPIDS FURNACE CLEANERS
Write for Details
DOYLE VACUUM CLEANER CO.
227 Stevens St., S.W.
Grand Rapids 7, Mich.

Use Classified Ads to fill your wants

Trademark
YAGER'S Soldering Salts — Paste
Reg.
Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if he cannot supply you.
½ lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz.
ALEX. R. BENSON CO., INC., HUDSON, N. Y.

Index TO ADVERTISERS

Acme Electric Welder Co. 122
Adams Co., The 99
Aeolus Dickinson 122
Aerofin Corp. ..... *
Air Control Products, Inc.....
.....Inside Front Cover
Airtemp Div. of Chrysler Corp..... 6
Airtherm Mfg. Co. 99
Allen Co., Inc., L. B.....118
Allen Corp. 116
American Air Filter Co., Inc..... 28
American Brass Co. 14
American Radiator & Standard Sanitary Corp. 12
American Rolling Mill Co., The..... 26
American Smelting & Refining Co..... 16
Auer Register Co. 113
Automatic Humidifier Co. 117
Automatic Products Co. 107

Barber Gas Burner Co., The.....117
Bayley Blower Co. 117
Benson Co., Inc., Alex R.....125
Berger Bros. Co. 122
Bethlehem Steel Co. 30
Beverly Shear Co. 121
Black & Decker Mfg. Co.....118
Brauer Supply Mfg. Co., A. G.....119
Bremil Mfg. Co. 121
Breuer Electric Mfg. Co..... *
Brundage Co. ..... *
Burt Mfg. Co. ..... *

Carey Co., Philip ..... *
Carnegie-Illinois Steel Corp. ...33 and 81
Catskill Metal Works, Inc.....115
Century Electric Co. 11
Cheney Metal Products Co.....121
Cherry Rivet Co. 36
Chicago Steel Service Co..... 68
Clarage Fan Co. 113
Cole Hot Blast Mfg. Co.....118
Columbia Steel Co. .....33 and 81
Conco Corp. 121
Condensation Engineering Corp. 112
Continental Steel Corp. 13
Cotta Transmission Corp. 121
Crescent Tool Co. 39

Damascus Steel Products Corp.....122
Des Moines Stove Repair Co.....122
Detroit Lubricator Co. 95
Dewitt Hotels 114
Doyle Vacuum Cleaner Co. 125
Dravo Corp. 85
Dreis & Krump Mfg. Co.....122

Effecto-Grille Co. 111
Eisler Engineering Co. 125
Elgo Shutter & Mfg. Co.....117
Evans Machine Co., L. R. 125
Excel Htg. & Air Conditioning Co.....119

Field Control Div., H. D. Conkey & Co. 94
Fireline Stove & Furnace Lining Co.... *
Follansbee Steel Corp. 105
Forest City Foundries Co.....120

Gehl Bros. Mfg. Co.....111
General Blower Co. 125
General Controls 90
General Electric Co. 93
Gerett Corp., M. A..... *
Gillen Co., J. L.....119
Grand Rapids Die & Tool Co., Div. of Expert Die & Stamping Co.....119
Grant Wilson, Inc. 21

Harrington & King Perforating Co.....109
Hart & Cooley Mfg. Co..... 96
Heil Co. ..... *
Henry Furnace & Foundry Co., The... 97
Hershey Machine & Foundry Co..... *
Hotstream Heater Co. ..... *
Hussey & Co., C. G..... 23

Ilg Electric Ventilating Co..... 15
Illinois Testing Laboratories, Inc..... *
Independent Pneumatic Tool Co. 3
Independent Register Co., The..... 98
Interstate Machinery Co. 125

Jackson & Church Company.....104
Jones Corp., The John Price.....119

Lamneck Products, Inc. ..... *
Lau Blower Co. 105
Leader Iron Works, Inc.....119
Libert Machine Co. 115
Lincoln Electric Co. ..... *
Lockformer Co. 114

Majestic Co. 116
Marley Co., The 123
Marshalltown Mfg. Co. 125
Maurey Mfg. Co. 88
May-Fiebeger Co. 112
McDonnell & Miller ..... *
Mercoid Corp., The 120
Meyer Furnace Co. 32
Michigan Tank & Furnace Corp..... *
Minneapolis-Honeywell Regulator Co..
.....Inside Back Cover
Morrison Products, Inc. 10
Morrison Steel Prods., Inc..... 34
Mt. Vernon Furnace & Mfg. Co.....117
Mueller Furnace Co., L. J..... 89

Nelson Corp., Herman.....24 and 25
Niagara Machine & Tool Works.....106

Olsen Mfg. Co., C. A..... 17
Omaha Stove Repair Works.....118
Osborn Co., J. M. & L. A..... 91
Owens-Corning Fiberglas Co..... 52

Palmer Mfg. Co. 92
Parker-Kalon Corp. 116
Payne Furnace & Supply Co.....103
Peck, Stow & Wilcox Co.....103
Peerless Foundry Co. 116
Penn Boiler & Burner Mfg. Corp..... *
Penn Electric Switch Co. 22
Perfex Corp. 31

Quincy Stove Mfg. Co.....120

Randall Graphite Products Corp..... 35
Reiner & Campbell Co., Inc..... *
Research Products Corp. .....
.....Outside Back Cover
Rock Island Register Co..... *
Round Oak Co. 118
Ruby Chemical Co. ..... *
Rudy Furnace Co. 29
Rybolt Heater Co. 8
Ryerson & Son, Inc., Joseph T..... 40

Sall Mountain Co. 5
Schwab Furnace Co. 118
Schwitzer-Cummins Co. 112
Servel, Inc. ..... *
Sheetlock Co. 111
Simplex Mfg. Co. ..... *
Skilsaw, Inc. 7
Standard Stamping & Perforating Co. *
Stanley Elec. Tool Div., The Stanley Works ..... *
Superior Sheet Steel Co., The, Div. of Continental Steel Corp. 13
Superior Steel Corp. 37
Sturtevant Co., B. F.....117
Swartout Co. 110
Syncromatic Corporation 110

Tennessee Coal, Iron & R. R. Co.....
.....33 and 81
Tuttle & Bailey, Inc..... *

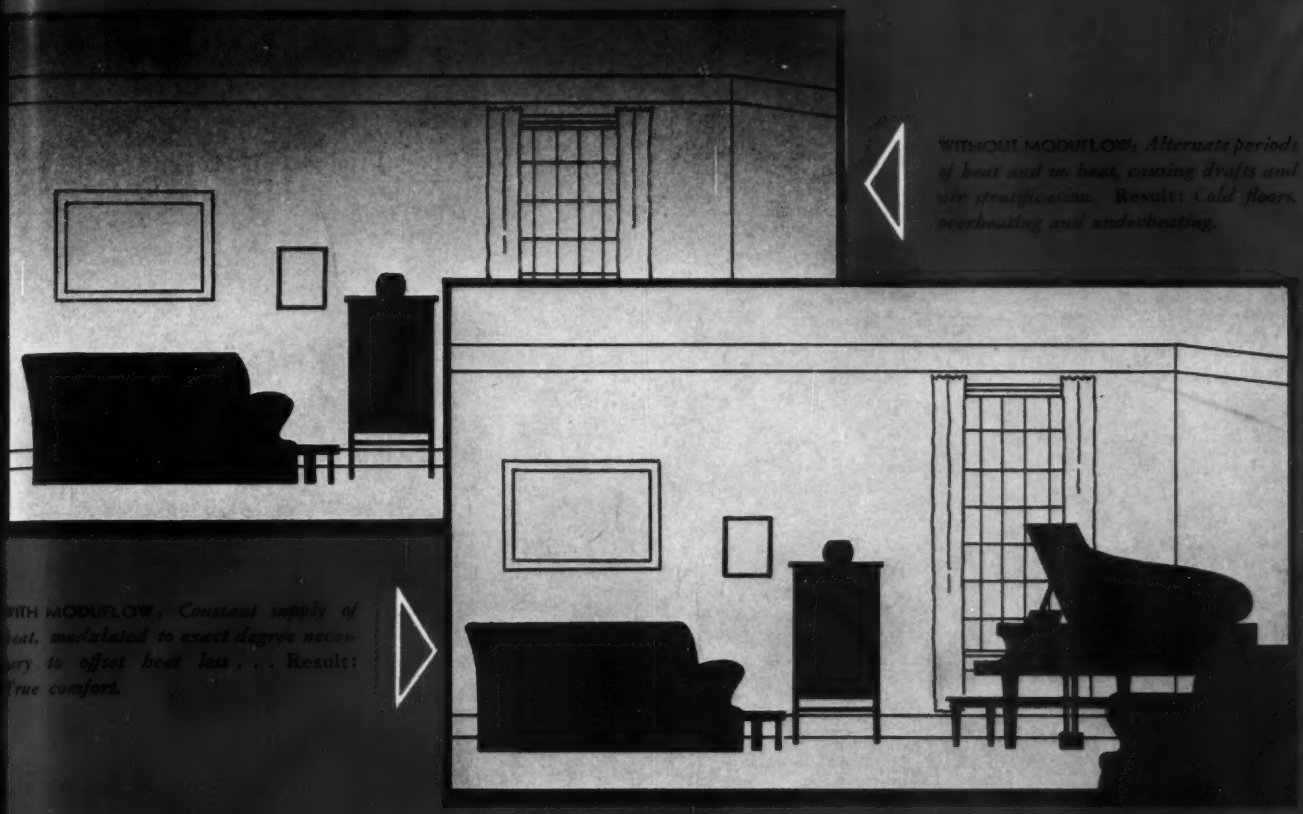
Union Mfg. Co.....114
U. S. Air Conditioning Corp..... 18
U. S. Register Co.....102
U. S. Steel Co.....33 and 81
U. S. Steel Supply Co.....33 and 81
Universal Power Corp.....109
Utility Fan Corp.....101

Verson Allsteel Co..... *
Viking Air Conditioning Corp..... 9
Viking Mfg. Corp..... 27

Wagner Electric Corp.....100
Wayne Oil Burner Co.....109
Weirton Steel Co..... 19
White Mfg. Co.....120
White-Rogers Electric Co..... *
Whiting Corp. ..... *
Whitney Mfg. Co., W. A.....115
Whitney Metal Tool Co.....108
Williamson Heater Co.....108
Wilson, Inc., Grant..... 21
Wise Furnace Co. ..... *
Wiss & Sons Co., J.....120
Wolff & Co., Benjamin..... *
Wysong & Miles Co..... *

York-Heat, Div. of York-Shipley, Inc.. 87

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.


WITHOUT MODUFLOW: Alternate periods of heat and no heat, causing drafts and air stratification. Result: Cold floors, overheating and underheating.
WITH MODUFLOW: Constant supply of heat, modulated to exact degree necessary to offset heat loss . . . Result: True comfort.

MODUFLOW CONTROL

DELIVERS MODULATED HEAT • • • CONSTANTLY

THE MINNEAPOLIS-HONEYWELL MODUFLOW CONTROL SYSTEM is the logical step in the evolution of home heating systems.

Instead of alternate periods of heat and no heat, due to intermittent heating and causing drafts and air stratification, which results in cold floors, the Moduflow System of Control delivers a constant supply of heat, modulated to the exact degree necessary to offset loss of heat from the home.

MODUFLOW

Moduflow accomplishes this by automatically mixing heat from the furnace or boiler with return air or water to exactly the temperature required, and continuously circulating this mixture through the heating system. In the case of steam heat, only enough steam to satisfy the heating requirements is circulated.

The Moduflow System of control will be available after the war for any automatic heating plant. Its cost for existing homes is surprisingly low. In new homes it is even less. It is easy to see why the Moduflow System will revolutionize postwar home heating . . . Write for full information to Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis 8, Minnesota. Branches and distributing offices in 49 principal cities.

MINNEAPOLIS Honeywell

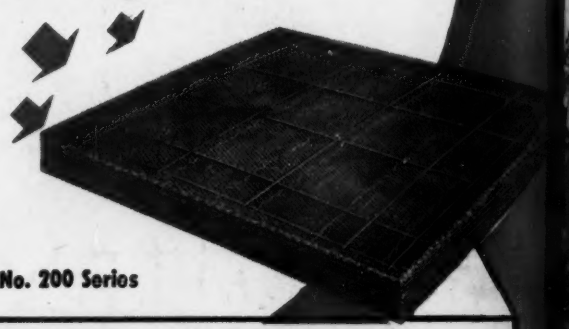
CONTROL SYSTEMS

R_x for FURNACE ASTHMA

The case is easy... but the customer is worried. After the long winter the house won't heat up these chilly spring days... the furnace is using more fuel than it should. You check the filters... they're choked with winter's soot and dirt. It's a clear case of furnace asthma! You're the doctor

... and here's the Cure

Change to RESEARCH AIR FILTERS. You can do the job in just a few minutes. New, clean Research Filters perk up the heating system, restore normal circulation of heat and air, save both fuel and furnace replacement costs. There's no shortage of RESEARCH AIR FILTERS. Your distributor has them ready for immediate delivery.



No. 200 Series

RESEARCH AIR FILTERS

You're the Doctor

You're doing a real service when you "prescribe" Research Air Filters. They save needed coal, cut operating costs. They save furnace equipment—clean Research Filters relieve furnace strain, reduce repairs and replacements. They insure better health, removing 99% of ragweed pollen, 91% of dust from the air.

Cash in on TIME TO CHANGE

Use the advertising and merchandising helps that have proven unusually successful for building sales. Display material, folders, mats — free; on request. Write for them, Dept. A3.

CATALOG OF FILTER SIZES

Yours for the asking

Lists sizes and number of Research Air Filters needed for various makes of forced warm air furnaces and air conditioning units.

RESEARCH PRODUCTS CORPORATION MADISON 3, WISCONSIN